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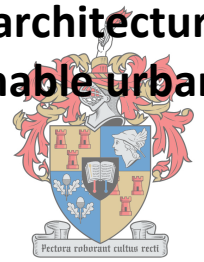
INFORMAL CAPACITIES

Exploring grounded architectural practice in transitions to sustainable urbanism in Cape Town

Philippus Rudolf Perold



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Declaration

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Philippus Rudolf Perold

Cape Town, December

2018

Abstract

The research presented in this dissertation pertains to the role of architectural practice in the *in situ* upgrading of informal settlements in Cape Town, with *in situ* upgrading being understood as a transition to sustainable urbanism in terms of socio-technical transition theory. Two ideas guide and structure the research: the notion of 'in[formal]ity' as a dialectic whole to replace the dichotomy of formal vs. informal (thereby enabling architectural professionals to develop the informal capacities required to engage constructively with residents in informal settlement upgrading interventions) and the phenomenon of grounded architectural practice (GAP) as unit of analysis. I embark on a hands-on exploration of GAP – engaging with residents through live project case studies undertaken in collaboration with local organisations – so as to arrive at a better understanding of this emergent mode of architectural practice, as well as the informal capacities that architectural professionals require in order to engage with residents in such practice. The empirical data obtained during the case studies is supplemented by an analysis of existing data derived from literature reviews. As a multi-disciplinary extension of third generation activity theory (AT) that enables empirical analyses of work activity, the method of developmental work research draws together the live project case studies and AT mapping, and in doing so provides a framework for the exploration of GAP. This framework incorporates the notion of 'in[formal]ity' into AT, mapping the activity systems of residents and local government as networked around the partially shared object of fostering transitions to sustainable urbanism. GAP is then positioned as an intermediate 'empty stage' between the live project case studies and the AT mapping, and is used to capture the ideas that emerge. The latter are understood to be the informal capacities that architectural professionals employ when engaging with residents in the co-production and collaborative design of upgrading interventions. These informal capacities offer architectural professionals (who it enables to comprehend the socio-technical regime of local government as well as the informal spatial practice of residents) the opportunity to foster spatial justice by advocating on behalf of these residents in support of the *in situ* upgrading of their settlements as a transition to sustainable urbanism. As such, this research does not aim to develop a new model for architectural practice – doing so would require a much larger data set than the three live project case studies that inform this research – but rather to explore the informal capacities that are required and developed when engaging in GAP in the specific context of Cape Town. In doing so, I wish to contribute to the influence of this emergent niche-level practice on the regime of conventional architectural practice, thereby encouraging more architectural professionals to engage with residents in supporting informal settlement upgrading as a transition to sustainable urbanism.

Abstract

Voorliggend doctoraatsonderzoek gaat over de rol van de architectuurpraktijk in de in-situ opwaardering van informele nederzettingen in Kaapstad, Zuid Afrika, waarbij in-situ opwaardering begrepen moet worden als onderdeel van de transitie naar duurzame stedenbouw zoals gedefinieerd binnen de socio-technische transitietheorie. Twee ideeën structureren het onderzoek: het idee van 'in[formal]iteit' als een dialectisch geheel dat de tweeledigheid van formeel vs. informeel vervangt (en hierdoor het architectenberoep in staat stelt om de nodige informele capaciteiten te ontwikkelen om op een constructieve wijze met inwoners samen te werken aan de opwaardering van informele nederzettingen) en het idee van de grounded architectuurpraktijk (GAP) als eenheid van analyse. Ik begin met een verkenning van GAP in de praktijk – door bezig te zijn met het uitvoeren van live project case studies in samenwerking met inwoners en plaatselijke organisaties – om zo een beter begrip te ontwikkelen van dit ontluikende type architectuurpraktijk en ook van de informele capaciteiten die architecten nodig hebben om dit in de praktijk samen met bewoners te doen. De empirische data, verzamelde tijdens deze case studies, worden aangevuld met data uit een literatuurstudie. De methode van 'developmental work research' – een multidisciplinaire uitbreiding van de derde generatie activiteitentheorie (AT) die een empirische analyse toelaat van activiteiten als een systeem van processen – brengt de live project case studies en de AT 'mapping' samen, en vormt zo een raamwerk voor de verkenning van GAP. Het uitgangspunt achter dit kader is het in kaart brengen en analyseren van de activiteitensystemen van inwoners en plaatselijke overheden als één netwerk met een (min of meer) gemeenschappelijke doelstelling, namelijk het bevorderen van de transitie naar duurzame stedenbouw. GAP wordt vervolgens gepositioneerd als een overgangsfase ('intermediate empty stage') tussen de live project case studies en deze analyse, en wordt gebruikt om de ideeën te visualiseren die gaandeweg naar boven komen. Deze ideeën verwijzen naar de informele capaciteiten die architecten inzetten tijdens het coproduceren en gemeenschappelijk ontwerpen van de opwaarderingsinterventies samen met bewoners. Deze informele capaciteiten bieden de architecten (die hierdoor inzicht krijgen in zowel het socio-technische regime van de plaatselijke overheden als in de informele ruimtelijke praktijken van de inwoners) de kans om ruimtelijke gerechtigheid te bevorderen door namens inwoners te pleiten voor de ondersteuning van de in-situ-opwaardering van hun nederzetting als een transitie naar duurzame stedenbouw. Het doel van dit onderzoek is dus niet om een nieuw model te ontwikkelen voor de architectuurpraktijk – dit zou een veel grotere dataset vragen dan de drie live projects die in dit onderzoek besproken worden – maar eerder om die informele capaciteiten te verkennen die nodig zijn en ontwikkeld zijn binnen GAP in de specifieke context van Kaapstad. Op deze manier wil het onderzoek bijdragen aan de impact van deze ontluikende niche-praktijk heeft op het regime van de conventionele architectuurpraktijk, en daardoor meer architecten aanmoedigen om, samen met bewoners, de opwaardering van informele nederzettingen te ondersteunen als onderdeel van de transitie naar een duurzame stedelijkheid.

Opsomming

Die navorsing wat in hierdie verhandeling voorgelê word, handel oor die rol van argitektuur-praktyk in die *in-situ*-opgradering van informele nedersettings in Kaapstad, met *in-situ*-opgradering wat verstaan word as ’n oorgang na volhoubare stedelikheid in terme van sosio-tegniese oorgangs-teorie. Twee idees lei en struktureer die navorsing: die idee van ‘in[formal]iteit’ as ’n dialektiese geheel wat die tweeledigheid van formeel vs. informeel vervang (en sodoende lede van die argitektuurprofessie in staat stel om die nodige informele vermoëns te ontwikkel om op ’n konstruktiewe wyse met inwoners om te gaan tydens opgraderings-ingrypings in informele nedersettings) en die verskynsel van gegronde argitektuurpraktyk (GAP) as eenheid van analise. Ek neem deel aan ’n aktiewe verkenning van GAP – deur betrokke te raak by die uitvoer van lewendeprojek-gevallestudies in samewerking met inwoners en plaaslike organisasies – ten einde ’n beter begrip te ontwikkel van hierdie ontluikende tipe argitektuur-praktyk, sowel as van die informele vermoëns wat lede van die argitektuurprofessie benodig om saam met inwoners betrokke te raak by sulke praktyk. Hierdie empiriese data word aangevul deur ’n analise van bestaande data wat deur middel van literatuurstudies verkry is. As ’n multi-dissiplinêre uitbreiding van derdegenerasie-aktiwiteitsteorie (AT) wat empiriese analises van werksaktiwiteit bemoontlik, bring die ontwikkelendewerksondersoek-metode die lewendeprojek-gevallestudies en AT-kartering byeen, en verskaf dit sodoende ’n raamwerk vir die verkenning van GAP. Hierdie raamwerk inkorporeer die idee van ‘in[formal]iteit’ in AT, en karteer die aktiwiteitsisteme van inwoners en plaaslike owerhede as genetwerk rondom die gedeeltelik-gedeelde doelwit om oorgange na volhoubare stedelikheid te bevorder. GAP word vervolgens geposisioneer as ’n intermediêre ‘leë verhoog’ tussen die lewendeprojek-gevallestudies en die AT-kartering, en word gebruik om idees wat na vore kom, vas te vang. Laasgenoemde word verstaan as die informele vermoëns wat deur lede van die argitektuurprofessie aangewend word tydens hul betrokkenheid by die ko-produksie en gesamentlike ontwerp van opgraderings-ingrypings saam met inwoners. Hierdie informele vermoëns bied aan lede van die argitektuur-professie (wat daardeur in staat gestel word om die sosio-tegniese regime van plaaslike owerhede sowel as die informele ruimtelike praktyk van inwoners te begryp) die geleentheid om ruimtelike geregtigheid te bevorder deur namens inwoners te pleit ter ondersteuning van die *in-situ*-opgradering van hul nedersettings as ’n oorgang na volhoubare stedelikheid. Gevolglik poog hierdie navorsing nie om ‘n nuwe model vir argitektuurpraktyk te ontwikkel nie – om dít te vermag vereis ’n veel groter datastel as die drie lewende projekte waarop hierdie navorsing berus – maar eerder om die informele vermoëns te verken wat benodig en ontwikkel word tydens GAP in die spesifieke konteks van Kaapstad. Sodoende wil ek bydra tot die invloed van hierdie ontluikende nisvlakpraktyk op die regime van konvensionele argitektuurpraktyk, en daardeur meer lede van die argitektuurprofessie aanmoedig om, tesame met inwoners, informelenedersettings-opgradering as ’n oorgang na volhoubare stedelikheid te ondersteun.

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Any opinion, finding, conclusion, or recommendation expressed in the research reported on here is my own, and none of the institutions listed above accept any liability in this regard.

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List of abbreviations

A

ACC	African Centre for Cities
ANC	African National Congress
AT	Activity theory

B

BEW	Built Environment Workstream
BNG	Breaking New Ground

C

CAP	Community action plan
CBD	Central business district
CBO	Community-based organisation
CCDI	Cape Craft and Design Institute
CIFA	Cape Institute for Architecture
COCT	City of Cape Town
CORC	Community Organisation Resource Centre
CPUT	Cape Peninsula University of Technology
CRADLE	Center for Research on Activity, Development, and Learning
CS	Code-switch / Code-switching
CUFF	Community Upgrading Finance Facility

D

DBRS	Design Build Research Studio
DPP	Dignified Places Programme
DWR	Developmental work research

E

ECD	Early childhood development
EI	Empirically informed
EPHP	Enhanced People's Housing Process

F

FEDUP	Federation of the Urban and Rural Poor

	G
GAP	Grounded architectural practice
	H
HSDG	Human Settlements Development Grant
	I
IDA	Incremental development area
IDP	Integrated Development Plan
ISN	Informal Settlements Network
ISTP	Informal Settlement Transformation Programme
IUA	International Union of Architects
	L
LTP	Lotus Park
LUM & BDD	Land Use Management and Building Development Department
LWP	Lwazi Park
	M
MFP	Multi-focal perspective
MLP	Multi-level perspective
	N
NDOH	National Department of Housing
NDOHS	National Department of Human Settlements
NDP	National Development Plan
NGO	Non-governmental organisation
NHBRC	National Home Builders Registration Council
NHC	Neighbourhood centre
NPC	National Planning Commission
NPO	Non-profit organisation
NUSP	National Upgrading Support Programme
	P
PHP	People's Housing Process
PRT	Professional resource team
PSO	Partially shared object
PSC	Project steering committee

R

RDP	Reconstruction and Development Programme
RSA	Republic of South Africa

S

SA	South Africa / South African (Chapters 2 to 5) / Symbolically attuned (Chapter 6)
SACAP	South African Council for the Architectural Profession
SAHO	South African History Online
SAIA	South African Institute of Architects
SDI	Shack / Slum Dwellers International
SHF	Sweet Home Farm
SNA	Safe node area
SNAC	Safe node area committee
SPUDD	Spatial Planning and Urban Design Department
SR	Self-reflexivity
SRP	Spatial reconfiguration plan
STT	Socio-technical transition theory
SUN	Sustainable Urban Neighbourhoods

T

TRA	Temporary relocation area

U

UBU	Ubuhle Bakha Ubuhle
UCT	University of Cape Town
UISD	Urbanisation (Informal Settlements) Department
UISP	Upgrading Informal Settlements Programme
UN	United Nations

V

VPUU	Violence Prevention through Urban Upgrading

W

WCG	Western Cape Government
WPI	Worcester Polytechnic Institute

Z

ZAR	South African Rand
ZPD	Zone of proximal development

Preface

"New informal settlements sprout overnight … the last arrivals affirming in practical terms their 'right to the city' … if you go there a year later, there will be relatively regular access to water, perhaps from a well, perhaps an 'informal connection' to a water pipe. And little by little the settlement consolidates, and it's no longer so informal. Before long, the settlement is already known by its name, and its inhabitants will be sooner or later torn between the desire for abandoning it if they ever had the opportunity to move to a more comfortable and convenient location, and the feeling of belonging to it."
(Subirós, 2013: 470-471)

"African cities are characterised by incessant flexibility, mobile, and provisional intersections of residents that operate without clearly delineated notions of how the city is to be inhabited and used. These intersections, particularly in the last two decades, have depended on the ability of residents to engage complex combinations of objects, spaces, persons, and practices. These conjunctions become … a platform providing for and reproducing life in the city."
(Simone, 2004b: 407-408)

"The existential core of urbanism is the desire for radical change to bring all the good implied in the original utopian association of 'the city'. This radical impulse stands in contrast to the necessary prudence and constraints of incremental change … the only way of intervening in conditions of profound complexity and entrenched power dynamics embedded in capitalist modernities."
(Pieterse, 2008: 6)

Chapter 1

Introduction

Chapter 1 Introduction

1.1 Sustainable urbanism: A normative position

This research pertains to transitions to sustainable urbanism in Cape Town, and the potential role that architectural practice can play in such transitions in the context of informal settlement upgrading. In order to provide a background to the problem statement and rationale for the research, I first present a normative position on sustainable urbanism. This position is determined by introducing the legacy of architectural modernism in South Africa, after which I discuss informal spatial practice and the concept of 'just sustainabilities'. In concluding the normative position, I introduce socio-technical transition theory (STT) and propose that the *in situ* upgrading of informal settlements constitutes a transition to sustainable urbanism.

1.1.1 Legacy of modernisms

The Berlin Conference of 1887-88 marks a crucial moment in the development of urbanism in Africa. With the colonial project consolidated and the continent divided amongst the imperial powers of Europe, new forms of hierarchical spatial organisation were imposed on African cities. This spatial organisation promoted racial segregation, as clearly manifested in the establishment of separate African townships, civil servant townships, and European quarters. In South Africa, many urban problems – fundamentally related to the process of modernisation – were framed as a problem of Africans vs. Europeans. This framing has contributed to the gradual entrenchment of apartheid spatial patterns in South African cities (Elleh, 2013: 103, 113). The nature of the relationship between apartheid and modernism was one of enablement, with

> "… the architecture of colonialism on the African continent [being] principally inscribed with a deep and enduring legacy of modernisms" (Low, 2013b: 156).

This legacy has also influenced the postcolonial incorporation of African cities into the globalising economy, this process having being focused on the extraction of raw materials rather than industrialisation and urbanisation, which has led to the expansion of informal settlements rather than planned urban development (Swilling, 2013: 66). At the same time, structural adjustment[1] and neoliberalism have increased the distance between government decision-making

[1] Structural adjustment refers to fiscal conditionalities placed on (predominantly post-colonial) countries that received development loans from the World Bank and International Monetary

and informal spatial practice (Simone, 2004a: 8). This results in a very narrow range of urban upgrading practices, with informal settlement upgrading mostly being understood as a process of clearance and relocation, the formalisation of land ownership, and the construction of subsidised housing by government-appointed contractors. Such practices – premised on capitalist economic relations – disregard informal spatial practice, giving credence to the assumption that the latter is a temporary phenomenon that will decline with growth and modernisation (Brown, McGranahan & Dodman, 2014: 4; Sheppard, 2014: 146).

According to Simone (2004a: 7) and Parnell (2014a: 541), urban development is more concerned with capturing informal settlement residents[2] in a "life aesthetic" defined by government (so as to make them governable) than with meeting their needs or realising their upgrading aspirations. Even in South Africa, the rhetoric and agenda of neoliberalism have been consolidated through engagements with global multilateral institutions such as the World Bank and International Monetary Fund, despite the socialist and Africanist intellectual roots of the post-apartheid government. South African urban realities and ideals have always been interwoven with Northern models by means of urban development strategies and integrated development planning (Oldfield, Parnell & Mabin, 2004: 293). In Cape Town, this is evident in "garden city" suburbs such as Pinelands and the modernist Foreshore development between the harbour and the central business district (CBD). However, the social and spatial exclusion that characterise apartheid-era urban development exacerbate contemporary environmental problems, particularly in informal settlements, which are themselves both a consequence and a cause of poverty and environmental degradation. More often than not, these settlements are located in geographically and environmentally hazardous locations and characterised by a lack of tenure security relating to land and dwellings, the absence of urban infrastructure and basic services, and self-built dwellings that do not comply with planning and building regulations (Jara, 2010: 61; UN-Habitat, 2016: 1-2).

Fund. The limits imposed on governments spending – especially in terms of welfare and social development programmes – had severe detrimental effects on the livelihoods of the populations of many African countries (Riddell, 1992:53).

[2] In the interest of brevity, from here on "residents" can be understood to refer specifically to informal settlement residents.

1.1.2 Informal spatial practice

The problems encountered in informal settlements today are universal experiences of modernity, which different countries have undergone in different ways (Elleh, 2013: 108). From this perspective, the dialectic nature of informal spatial practice – simultaneously a result of and a response to the constraints and limitations of formal urban development – can be understood. As such, the relationship between formal urban development and informal spatial practice is constantly shifted, remade, and redefined (Navarro Sertich, 2010: n.p.). Mbembe (2017: n.p.) refers to "deep histories and entrenched cultures of curiosity, invention and innovation" in Africa, describing them as a result of continual innovation in response to brutal circumstances, and drawing attention to the tacit knowledges and skills embedded within them. These "ways of being, ways of thinking, and ways of making" that Mbembe refers to influence informal spatial practice as well. Informal spatial practice – both in terms of living and income – characterises everyday life for the majority of urban residents in Africa. In future, African cities will remain predominantly informalised, and residents will have to continue to rely on their own efforts to secure livelihood and shelter (Pieterse, 2013a: 105). Informal spatial practice is the inevitable result of rigid (and often outdated) formal urban development processes. These processes are not sufficiently responsive to demands for urban change, nor able to address new imperatives such as climate change. Subsequently, for residents who are spatially excluded and economically marginalised, the only viable option to sustain an urban livelihood is to disregard formal processes.

De Soto (1989: 13) describes informal spatial practice as "a system of extra-legal norms" that – rather than simply surrendering to anarchy and deprivation – compensates for the shortcomings of formal urban development processes. Residents' informal spatial practice, embedded into a dynamic and ordered underground network, intrudes into every aspect of the functioning of society and disrupts the coherence of the planned urban landscape (Watson, 2014: 102). Notwithstanding this, it is important to acknowledge, accept, and accommodate such practice in order to meet the needs of all urban residents (Ewing, 2017: 9). This understanding of informal spatial practice challenges the fundamental assumption of modernisation theory, i.e. that development occurs incrementally by means of government interventions. Instead, the majority of urban growth can be attributed to actors within the informal sector (Habraken, 2005: 68; Pieterse, 2011: 6). This "self-responsibility for urban survival" creates opportunities for residents to

> "… collaborate with people often very different from themselves, operating in different parts of the city, and with whom they work out highly particularised relationships and ways of dealing with each other" (Simone, 2004a: 5).

As indicated in Figure 1.1, the marginalisation that results from the disjuncture between local government and residents has the potential to create a zone of possibility and autonomy, allowing residents to develop complex, dynamic, and highly improvising strategies for survival (Pieterse,

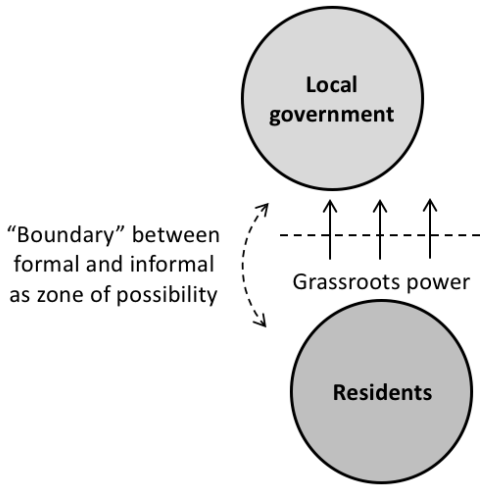

Figure 1.1 "A new kind of bottom-up inclusive urbanism"
Diagram by author, based on Pieterse (2008: 3) and Swilling (2013: 78)

2008: 3). Swilling (2013: 78) describes such informal spatial practice as a "new kind of bottom-up inclusive urbanism" that uses grassroots power to spur local government into action, rather than waiting for a proactive project of inclusion. As such, informal spatial practice entails "unsteady, provisional, and constantly shifting" possibilities and tactics that are important levers for collective action, and residents are adept at exploiting the opportunities for innovation and transformation that emerge where the formal and the informal meet (Du Plessis, 2011: 51; De Boeck, 2013: 94-97).

1.1.3 Just sustainabilities

The origin of the sustainable urbanism discourse can be traced back three decades, to the "Our Common Future" report compiled by the United Nations World Commission on Environment and Development (UNWCED) in 1987. In this report, sustainable development is described as being able to "meet the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland, 1987: 54). A massive body of literature on sustainable development has developed since, leading to competing and conflicting views over the meaning (and relevance) of the concept of 'sustainability' (Agyeman, 2013: 4). It has become evident that sustainability cannot be reduced to environmental concerns alone, and despite the contestation that surrounds it, sustainability has widespread moral appeal due to its dual ethical

foundation which gives expression to both realist (natural law) and consensualist (democratic) norms (Lafferty, 1996: 185). As such, sustainability may be reframed to foster social justice, improved environmental quality, and more deliberative forms of democracy (Agyeman & Evans, 2004: 163). To this end, sustainability should be addressed in sociological rather than technical terms, so as to become an ethical issue concerned with the future well-being of others and their ability to live in an environmentally degraded world (Till, 2009: 182). This perspective links environmental quality and human equality, and supports the establishment of

> "… a truly sustainable society where wider questions of social needs and welfare, and economic opportunity are integrally related to environmental limits imposed by supporting ecosystems" (Agyeman, Bullard & Evans, 2002: 78).

The concept of 'just sustainabilities' proposes four essential conditions for achieving sustainable development: (i) improving quality of life and well-being; (ii) meeting the needs of both present and future generations; (iii) justice and equity w.r.t. recognition, process, procedure, and outcome; and (iv) living within ecosystem limits. Agyeman (2005: 92) defines this concept in the plural form, recognising that there is no one universal description for sustainability: rather, the relative, cultural and place-bound nature of sustainable development must be recognised. Such recognition draws attention to the enormous loss of human potential (as detrimental to our future as the loss of environmental potential) that results from social inequality, in that it prevents residents from developing their capacities and realising their potential (Agyeman, 2013: 5-7). Three models of sustainable development relate to the concept of 'just sustainabilities':

- A boundary-oriented model comprising planetary and social boundaries, indicated in Figure 1.2 (i). An inner boundary represents the social foundation (below which lie dimensions of human deprivation) and an outer boundary represents the environmental ceiling (beyond which lie dimensions of environmental degradation). The space between the two represents inclusive sustainable development: an "environmentally safe and socially just space for humanity to thrive in" (Raworth, 2012: 1-4). This framework draws attention to the interdependence of – as well as complex and multi-layered interactions between – the boundaries (ibid.: 16-18).

- A broader model of urban sustainability, with economic, social, ecological, and physical sustainability as four interlinked domains bound together by political sustainability. These domains of sustainability and their linkages are indicated in Figure 1.2 (ii). In this model, social sustainability aims to improve quality of life through equal access to – and the just distribution of rights to use and to appropriate – both the natural and built environment (Allen, 2002: 15-18). Pieterse (2010b: 14) notes that unequal societal power relations pervade all the domains of urban sustainability, and that processes of democratisation, debate, and participation by marginalised groups can address this. Such processes can also address architectural professionals' inadequate understanding of relational and communal needs, and in doing so reduce the disparity between their values and those of informal settlement residents (Patel, 2004: 288).

- Looking beyond technological innovations towards institutional and relational innovations will enable architectural professionals[3] to deepen their engagement with informal settlement residents (Baker, 2013: 405). Figure 1.2 (iii) represents an architectural approach to sustainability that expands beyond short-term interactions and technical fixes to include longer-term interactions between nature and society. Architectural professionals are particularly well situated to deal with the tensions between short-term demands and long-term concerns, as the complexity of architectural practice presents a wide range of options that are open to multiple interpretations. It is this openness – and the architectural innovation that it fosters – that present architectural professionals with the opportunity to enable and empower informal settlement residents (Till, 2009: 183).

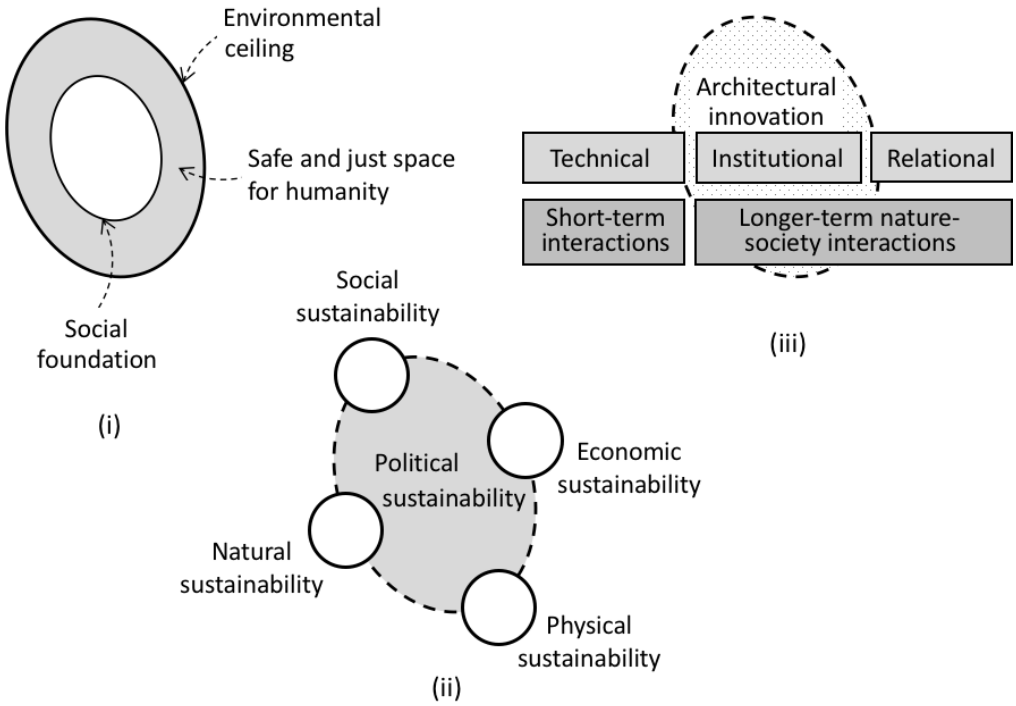

Figure 1.2 Three models of sustainable development: (i) A model comprising planetary and social boundaries, (ii) a broader model of urban sustainability, and (iii) an architectural approach to sustainability. Adapted from Raworth (2012: 4), Allen (2002: 18), Till (2009: 183), and Baker (2013: 405)

[3] The South African Council for the Architectural Profession (SACAP) allows for four professional registration categories: draughtsperson, architectural technologist, senior architectural technologist, and architect. For the sake of inclusivity, I refer to them collectively as "architectural professionals".

All three models anticipate the involvement of residents in transitions to sustainable urbanism, so as to enhance the formation of social capital and to enable effective participation in urban decision-making. When residents are allowed to take ownership of informal settlement upgrading interventions, they add value to the built environment (Aliyu, Ebohon & Gyoh, 2014: 19). Furthermore, taking ownership strengthens the voice and organisational capacity of informal settlement residents, and allows such sustainability transitions to be informed by the knowledge that residents have accumulated through their own lived experiences (Maguire, 2001: 588; Jara, 2010: 74). Given the enormous effort required to address sustainable development on a global or national scale, transitions to sustainable urbanism at settlement level (the scale at which most people first encounter the environment) provides an opportunity for interventions that are quicker, more successful, and more noticeable (Aliyu et al., 2014: 20).

1.1.4 Socio-technical transitions

Socio-technical transition theory (STT) complements the three models of sustainability discussed above, in that it explicates the interdependencies between the complex and multi-layered interactions in sustainability transitions by mapping them onto a single framework (Geels, 2004b: 20; Meadowcroft, 2011: 70). This framework is referred to as the multi-level perspective (MLP). Swilling, Musango, and Wakeford (2015: 5) employ the MLP in their research at the Sustainability Institute at Stellenbosch University, and cite Grin, Rothmans, Schot, Geels and Loorbach (2010: 2) in describing this perspective as "an open-ended orientation for change". They posit that a just transition to sustainable urbanism entails a deep structural transformation that achieves both developmental welfarism – premised on accelerated economic growth achieved through industrialisation and urbanisation – and a socio-technical transition that results in a resource-efficient economy. Whereas at first glance, accelerated economic growth and a resource-efficient economy appear to be at odds with each other, this combination has the potential to foster a just transition that entails human well-being (comprising sufficient income, education, and health) within a sustainable world characterised by decarbonisation, resource efficiency, and ecosystem restoration (Swilling et al., 2015: 2-3). Socio-technical transitions entail system innovations – the fundamental reconfiguration of technologies, markets, institutions, knowledge, consumption practices, and cultural norms – that occur when a disruption in a particular socio-technical system (such as energy, housing or water provision) stimulates the emergence of a new system structure (Geels, 2011: 24). System innovations involve (i) the co-evolution of cultural, social, and political institutions; (ii) the everyday activities associated with a system; and (iii) technological changes within a subsystem that enables new and unexpected uses of artefacts (Geels, 2004b: 20). These innovations result from the interaction between multiple types of actors and institutions that operate at different levels within or outside of a particular context (Lawhon & Murphy, 2011: 357), as indicated in the hierarchical framework (Figure 1.3) provided by the MLP:

- The socio-technical landscape is the most widely and generally defined (macro) context in which transitions occur, and is constituted by the cultural and normative values, broad political coalitions, long-term economic developments, and accumulating economic problems that influence development trajectories.

- Socio-technical regimes form the relatively stable (meso) level of the MLP, and are constituted by the codified, stable, and universally agreed-upon conventions, rules, and norms that guide the use of the specific technologies and everyday practices of those who participate in a particular regime. As such, (conventional) architectural practice operates on this level.

- The least stable (micro) level consists of socio-technical niches, where innovation and learning occur as new social networks are built by those who wish to advance to more sustainable alternatives to those that exist in a particular regime (Geels, 2004b: 32-34; Geels & Schot, 2007: 400).

The role of regimes within socio-technical systems is two-fold: (i) they organise the activities within the system, and (ii) structure the relationships between diverse actors, including local government, local organisations, professionals, residents, and researchers. When all the actors within a regime are aligned through a shared understanding of priorities, rules, practices, and

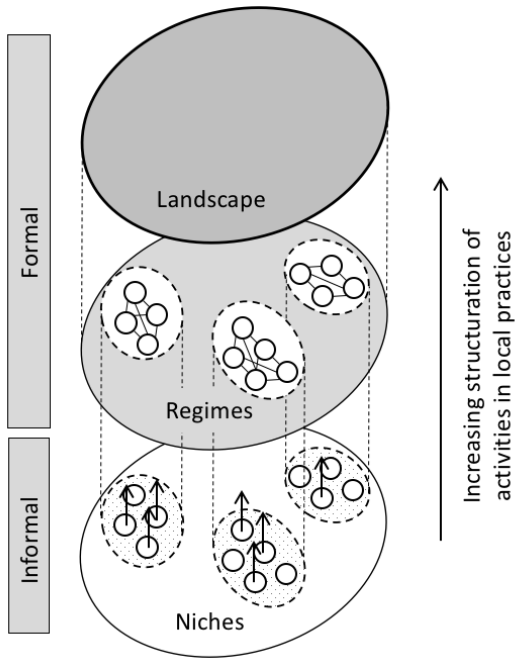

Figure 1.3 The multi-level perspective (MLP): A framework for sustainability transitions
Adapted from Geels (2004a: 913)

conventions – thus only allowing incremental innovations – the system is locked into a particular socio-technical trajectory and is "dynamically stable" (Lawhon & Murphy, 2011: 358). However, the priorities, rules, practices, and conventions within regimes are related to both the landscape and niche level. Landscape pressures such as climate change and spatial inequality challenge the shared understanding within regimes and stimulate the development of system innovations. These innovations develop at the niche level, and are integrated into regimes, altering their structures in the process. In turn, the new (altered) regime then influences the landscape pressure that initiated the innovation (Geels, 2004b: 34; Swilling et al., 2015: 5). Niches are distinct by virtue of the uniqueness and scale of the activities that occur within them (Geels & Schot, 2007: 400). They form protected spaces where small networks of actors can learn about and develop new and novel technologies and practices, and then agitate to get these onto the developmental agenda (Swilling et al., 2015: 6). The research presented in this dissertation pertains to an emergent mode of architectural practice, at niche level, that supports *in situ* upgrading of informal settlements – understood as a transition to sustainable urbanism – and explores how it can transform conventional architectural practice. Such practice, referred to in this research as grounded architectural practice (GAP), engages with informal spatial practice and requires of architectural professionals to engage constructively with conflict and dissension through participatory and dialectic processes (Dodd, 2011: 8-9).

1.2 Problem statement and rationale

In its engagement with the 'subversive realities' of informal spatial practice, GAP entails border-crossing: a form of professional suicide that has the potential to energise both scholarship and practice by encouraging radical transgressions in professional thought and practice. Pieterse (2005: 53) further describes the challenge inherent in border-crossing as being able to achieve a balance between "the straightjackets of professional norms and codes" and "getting lost in the rabbit hole of transgressive insurgency". Once this balance has been found, contextual solutions that work in the present and add up to structural change in the future can be developed. For architectural professionals, this includes proactive engagement with residents to support the upgrading of their informal settlements (Marschall & Kearney, 2000: 1). A shift of power away from local government has led to informal spatial practice becoming a dominant mode of urban development in the global South, and provides architectural professionals with an opportunity to engage with residents as co-designers rather than mere beneficiaries of local government upgrading interventions (Boonstra, Vogel & Slob, 2014: 258). Such engagement holds the potential to reformulate architectural practice: to resist its present marginality by empowering residents and recognising them as equal partners in the production of the built environment (Till, 2009: 2). This recognition will require a blurring of the notions of formal and informal – negating the artificial boundary that separates the two – and allowing procedural as well as everyday activities to inform architectural practice (Barac, 2013: 39; Oldfield, 2015: 2081).

As indicated in Figure 1.4, such an interpretive model of architectural practice – integrating disciplinary knowledge with the procedural knowledge of local government officials as well as the everyday knowledge of residents – enables architectural professionals to approach the city as a "fundamentally emergent and open-ended reality", and to fulfil the profession's ethical obligation to support residents in "their stubborn appropriation of the city" (Pieterse, 2008: 14). Notwithstanding continued calls for engagement with informal settlement upgrading[4], the architectural profession remains marginal to such endeavours in Cape Town, and indeed the whole of South Africa. By and large, architectural professionals fail to support and engage with resident-driven initiatives such as reblocking[5] and *in situ* upgrading (Combrinck, 2015: 3). Pieterse (2005: 52) laments the extent to which the anticipated futures of South African cities have remained unchanged, stating that we have merely "tinkered at the edges". This prioritisation of disciplinary knowledge over that of residents results in upgrading interventions initiated by local government failing to respond to the needs and aspirations of residents (Patel, 2004: 284). As a result, service delivery protests have become commonplace in South Africa over the past decade, with non-governmental organisations (NGOs) often having to act as intermediaries between residents and local government in order to identify and address the cause of protest (Huchzermeyer, 2011; Watson, 2014; Jordhus-Lier, 2015; Osman, 2015).

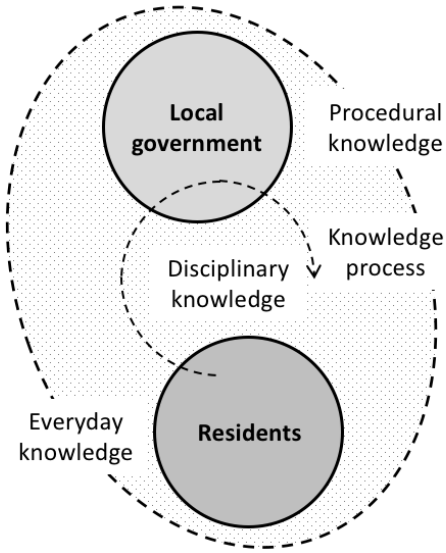

Figure 1.4 An interpretive model of architectural practice
Diagram by author, based on Barac (2013: 39-41)

4 Such calls are most evident in the publications of the South African Institute of Architects (SAIA): the bi-monthly *ArchSA* (Julian Cooke, ed., particularly between 2012 and 2015), and the annual *Digest of South African Architecture* (Iain Low, ed., from 2008 onwards).

5 Reblocking is the spatial reconfiguration of informal dwellings to allow for vehicular access and the installation of service infrastructure in informal settlements (Cooke, 2014:26-27), and is discussed in more detail in section 2.1.

The interest and values held by architectural professionals are different to those of local organisations, and even more so compared to those held by residents. This is due, in part, to the artificial boundary that exists between the formal and the informal (Roy, 2005: 148). According to Combrinck (2015: 3-4), this boundary compromises the "ability to engage meaningfully in a context that fundamentally challenges the construct of professional architectural service". As a result, rather than appreciating informal spatial practice as a "dynamic social system there to be engaged with, open to transformation" (Till, 2009: 14), architectural professionals rely on familiar – yet inappropriate – conceptual dichotomies such as formal vs. informal. However, these dichotomies are socially constructed, and rather than being inevitable, they are contingent social developments (Boghossian, 2013: 8). Architectural professionals are compelled by their central role in society – as spatial experts with a responsibility to foster the greater good for all (Sverrisdóttir, 2014: 104-106) – to actively explore ways of supporting residents in their transitions to sustainable urbanism. In their respective doctoral dissertations, Massey (2013b: 186) and Combrinck (2015: iii) also identify the need for further research on architectural practice in relation to informal settlement upgrading. To this end, I propose two ideas that will guide and structure the research presented in this dissertation:

- The notion of 'in[formal]ity' as a dialectic whole to replace the dichotomy of formal vs. informal, thereby enabling architectural professionals to 'see the formal in the informal' and to develop the informal capacities required to engage constructively with residents in informal settlement upgrading interventions. This notion requires of architectural professionals to appreciate informal spatial practice as a legitimate and constructive form of urbanism. Doing so will enable them to explore the origins of the formal within the informal, as well as to appreciate the need for flexibility within the formal, so as to respond to landscape pressures such as climate change and spatial inequality. In response to the statement that "architecture has become too important to be left to architects" (De Carlo, 2005: 13), researchers are called on to explore residents' informal spatial practice: to explore how it can unsettle conventional architectural practice so as to move beyond the "frontiers of the possible" (Meadowcroft, 2011: 73).

- The phenomenon of GAP as unit of analysis, in response to Pieterse's (2011: 5) comment that researchers are not likely to "arrive at a denser, expansive, and fuller conceptualisation … by merely collating idiosyncratic micro examples and case studies". In this research I do present individual case studies – the most prominent way in which GAP as an emergent mode of practice is reported – and then develop the insights gained from them by means of mapping and comparative analysis. The latter relate to patterns that emerge in relation to the nature of practice as an activity, as well as to the competencies and capacities that architectural professionals employ in their interaction with residents and local government. Together, the mapping and analysis seek to inform an understanding of GAP as a phenomenon "beyond the scale of individual architectural projects" (Barac, 2013: 42). As a complement to and continuation of recent research conducted by Combrinck in Slovo Park in Johannesburg – relating to the marginality of architectural practice in informal settlement upgrading interventions – I

will illustrate that her statement that "the process of architectural engagement requires transformation in order to be more responsive to the complexity of the circumstances surrounding informal settlement upgrading" (Combrinck, 2015: iv) holds true in Cape Town as well. Where she drew on the method of community action planning, developed by Goethert and Hamdi (1997), the research presented in this dissertation employs the method of developmental work research (DWR), which I explicate in section 1.4.2.

1.3 Aims and objectives

As stated in the title of this research, the overarching aim was to explore GAP in transitions to sustainable urbanism in Cape Town so as to determine the informal capacities that architectural professionals employ when they engage with residents in support of the upgrading of their informal settlements. Accordingly, in the normative position presented in section 1.1, I have argued that informal settlement upgrading constitutes a transition to sustainable urbanism. In STT terminology, GAP is a niche-level response to the landscape pressure to achieve sustainable urbanism, which alters the structure of the regime of conventional architectural practice (as indicated in Figure 1.5). Therefore, the three subsidiary aims of the research were structured according to the MLP.

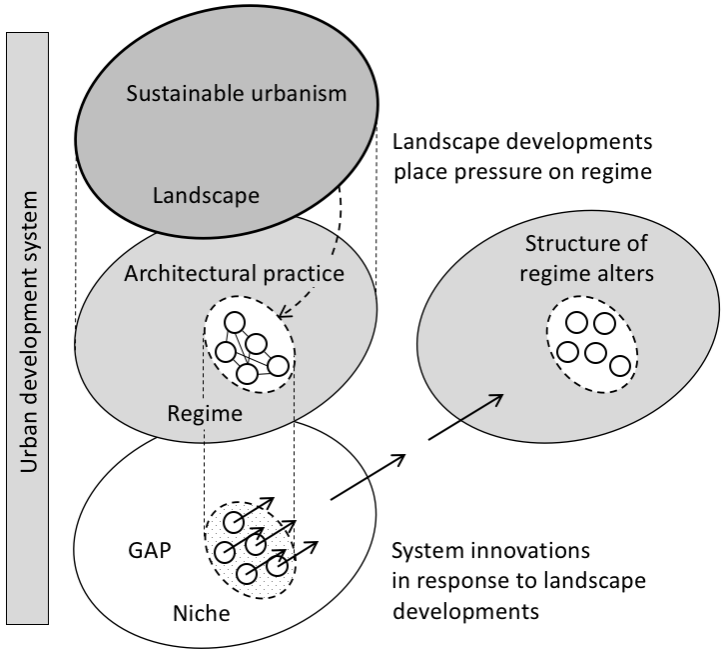

Figure 1.5 GAP as a niche-level response to the landscape pressure to achieve sustainable urbanism. Adapted from Geels (2004a: 915)

Aim 1 **Explore the regime level:**
Informal settlement upgrading and architectural practice in Cape Town

Objective 1.1

Undertake a literature review regarding informal settlement upgrading in South Africa, with specific attention to Cape Town.

Objective 1.2

Perform a discourse analysis of texts on architectural practice in South Africa.

Objective 1.3

Undertake a literature review in order to develop a theoretical perspective on 'in[formal]ity' as spatial practice.

Aim 2 **Explore the niche level:**
GAP as an emergent mode of architectural practice

Objective 2.1

Undertake a literature review on the development practice of local organisations in Cape Town, with particular attention to the architectural practice embedded therein.

Objective 2.2

Introduce third generation activity theory (AT) as the analytical framework for this research and adapt it to incorporate the notion of 'in[formal]ity'.

Objective 2.3

Discuss GAP as an intermediate conceptual tool within the framework of DWR.

Objective 2.4

Explore informal settlement upgrading interventions in Cape Town by conducting live projects in collaboration with three local organisations.

Objective 2.5

Map the information gathered during the live projects according to the activity system framework provided by third generation AT.

Aim 3 **Explore the impact of the niche level on the regime level:**
Informal capacities

Objective 3.1

Perform a comparative analysis of the empirical findings derived from the AT mapping.

Objective 3.2

Derive conclusions for the research by synthesising the comparative analysis of empirical findings with the theoretical perspective on informal spatial practice.

1.4 Research design and methodology

1.4.1 Research design: Heuristic inquiry

The three subsidiary aims of the research entail an exploration of GAP in transitions to sustainable urbanism in Cape Town and are organised according to the MLP so as to achieve a balance between the structure and flexibility required for such a phenomenological exploration. There are "many distances" that separate researchers from their research context, and to negate these a grounded engagement with "the level at which reality is mobilised" is required (Barac, 2013: 45). As such, this exploration is designed as a heuristic inquiry during which I will engage in a hands-on exploration of GAP so as to arrive at a better understanding of this emergent mode of architectural practice, as well as the informal capacities that architectural professionals require in order to engage with residents in such practice. 'Heuristic inquiry' is defined as an attempt to discover the nature and meaning of phenomena by means of exploration and discovery. It fosters a subjective and creative connection between researcher and phenomenon, and through a direct experience of the phenomenon concerned, the researcher's experiences are combined with those of the research participants (Hiles, 2001: n.p.; Djuraskovic & Arthur, 2010: 1569-1572).

This type of phenomenological exploration is complementary to the practice of exploring circumscribed spaces and times so as to "prepare specific actors to reach and extend themselves across a larger world and enact … possibilities of urban becoming" (Simone, 2004a: 3). These explorations generate more nuanced and rounded views that recognise residents as active agents in constructing meaningful lives for themselves (Murray & Meyers, 2006: 3). Such engaged and collaborative research can potentially enable architectural professionals to build a "richer, thicker, more contextual and relational conversation about neighbourhoods, activism, and everyday struggles" (Oldfield, 2013: n.p.). This type of research embraces the concept of 'relationality', both as the phenomenon that enables complex systems to exist, and the activity "of not being in one position at all, but continuously exploring in-between any two or more points of reference" (Haggis, 2008: 165; Perold & Costandius, 2014: 35). Heuristic inquiry is sensitive to qualitative relationships, such as structure and patterns (Kleining & Witt, 2000: n.p.), and as such is a suitable research design to explore GAP as an emergent mode of architectural practice in residents' transitions to sustainable urbanism. In conducting this exploration, I have generated empirical data by engaging with residents through live projects undertaken in collaboration with local organisations so as to explore the spatial practice of residents in informal settlement upgrading interventions. This empirical data is supplemented by an analysis of existing data derived from literature reviews (as detailed in the research objectives in the previous section). By employing AT mapping – adapted to the notion of 'in[formal]ity' so as to provide a flexible structure on which to map the findings of the phenomenological exploration – as well as comparative analyses, I was then able to identify the patterns that emerge in this activity so as to develop a better understanding of GAP.

1.4.2 Methodology: Developmental work research

Researchers need to engage in a "disciplined pursuit of fundamental meanings connected to significant human experiences"; as such, a heuristic inquiry requires a degree of order (Djuraskovic & Arthur, 2010: 1572). I employ developmental work research (DWR) to provide this order. Engeström (1991a: 79) describes DWR as a multi-disciplinary extension of AT that enables researchers and practitioners[6] to perform empirical analyses of work activity (such as architectural practice) that "lead to the threshold of the future" by uncovering the shortcomings of such activity. As such, these analyses constitute a unique learning space that creates a bridge between what is known and what needs to be learnt (Hardman & Amory, 2015: 14). This hypothetical learning space is referred to as a zone of proximal development (ZPD) and enables researchers to analyse work activity and to explore how the contradictions that arise as the activity unfolds over time are resolved. According to Engeström (1991a: 79), three methodological ideas underpin DWR:

- The unit of analysis is a collective, object-oriented activity system that is mediated by artefacts and the community[7] of stakeholders that assemble around the activity, as well as the rules and division of labour that pertain to the activity[8].
- The causes of disturbances, innovations, and change are understood as contradictions embedded within the activity system. These contradictions are identified through analyses of the dilemmas, conflicts, and discoordinations that arise in everyday practice.
- Change and development are understood as collective learning processes that lead to the "local expansive construction of new artefacts and new models of shared practice".

These methodological ideas pertain to the activity system framework embedded in DWR, which is used to analyse the "mirror of everyday practice" (ibid.). In this research, as indicated in Figure 1.6, the latter is provided by the live project case studies which enable me to engage with concrete data on the history of the upgrading intervention – accessed by means of semi-structured informal interviews, local organisation documentation, and other publications – as well as with ongoing everyday practice, through my participation in the live project itself. In the course of these analyses, intermediate conceptual tools that hold the potential to lead to new models for practice are invented and employed. In the research presented in this dissertation, GAP is understood as both an emergent mode of practice and an intermediate conceptual tool. In the five subsections that follow, I address issues that pertain to the research methodology: researcher positionality, sampling and triangulation, delimitations and limitations, data collection, and data analysis.

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6 Engeström refers to researchers and practitioners, drawing attention to the latter's involvement in the phenomenon under observation. In my opinion, this confirms DWR as an apt methodology for my own heuristic inquiry into GAP.

7 AT assigns a particular meaning to the word "community", and as such – where possible – I have refrained from using it outside of that context.

8 The elements that constitute an activity system will be discussed in greater detail under the heading "Data analysis: Activity system mapping", later on in this subsection.

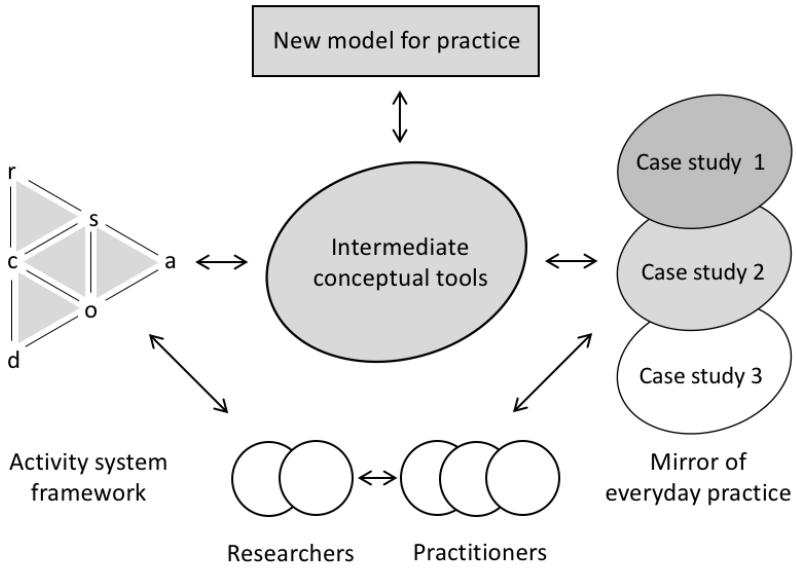

Figure 1.6 The process and constituent elements of DWR (the activity system framework is elucidated in Figure 1.8). Adapted from Engeström (1991a: 80)

1.4.2.1 Researcher positionality

A growing number of architectural professionals seek out a field of specialisation beyond their professional education, and in doing so combine their competencies for collaborative multidisciplinary work and problem-solving with the capacity to conduct scientific research (Després, Vachon & Fortin, 2011: 40). For me, doing so (first as practitioner and later as academic) has informed a process of continuous learning over the past 15 years. My professional qualifications – a bachelor degree in Architectural Studies (B. Arch. Stud.), followed by a bachelor degree in Architecture (B. Arch.), both obtained at the University of the Free State (UFS) – provided me with an appreciation of the complexity of architectural practice. However, my architectural training has provided me with very little insight into, nor opportunity to engage with, the contested socio-economic context within which the architectural profession operates in South Africa. I addressed this gap by obtaining a master's degree (M. A.) at the Centre for Africa Studies at UFS, with a specialisation in the dynamics of urban and rural development, presented by the Department of Geography. Teaching in the Department of Architectural Technology and Interior Design at the Cape Peninsula University of Technology (CPUT) over the past decade has provided me with an opportunity to feed the knowledge gained during my postgraduate studies back into architectural practice – particularly through live projects undertaken by me and my colleague Hermie Delport at the Design Build Research Studio (DBRS). Being aware of the challenges of collaboration between practitioners and academics (Andrew, Tolson & Ferguson, 2008: 4), live projects have provided me with a middle ground from which to engage with residents' transitions to sustainable urbanism as, simultaneously, practitioner and researcher. The research presented in this dissertation is a continuation of this trajectory.

1.4.2.2 Sampling and triangulation

The majority of poor residents in Cape Town live on the Cape Flats, a sandy, low-lying area that was sparsely populated until the 1960s. During the 1960s and 1970s, forced evictions from central Cape Town, in accordance with the Group Areas Act (1950), led to the establishment of townships such as Gugulethu and Mitchells Plain. From the 1980s onwards, in spite of influx control by the apartheid government, an illegal process of large-scale migration from the impoverished rural areas of the former homelands in the Eastern Cape province commenced, leading to the establishment of more townships on the urban periphery, including Delft and Khayelitsha. This combination of apartheid social engineering, spatial planning, and rural-urban migration resulted in massive urban sprawl (Figure 1.7). Today, Khayelitsha is the second largest township in SA, exceeded in size only by the township of Soweto in the Gauteng Province (SAHO, 2013). In the case of some informal settlements, however, residents have been able to occupy well-located parcels of land, thereby challenging the social relations and urban structure of the apartheid era (Jara, 2010: 68-69). The rapid growth of such informal settlements – coupled with the informal practices that support this growth – challenges the "modernist development project" (Cirolia, Görgens, Van Donk, Smit & Drimie, 2016: 4). However, the (formal) growth of cities such as Cape Town is driven through policy implementation by local government, private developers, and investors who have a very limited comprehension of, and concern with, the needs and aspirations of residents (Lepik, 2013: 11-13).

Figure 1.7 Four apartheid-era townships and their peripheral location in relation to the Cape Town CBD. Photographs: Google Earth, 2017

Housing is approached in quantitative terms, being "delivered" with little concern for creating opportunities to facilitate personal growth, skills development, and sustainable employment (Cooke, 2005b: 5). Since the 1980s and early 1990s, demands for the restructuring and transformation of Cape Town have called for the city to become more compact and integrated. The urban development of Cape Town during the past two decades, however, suggest that these calls have not been heeded, and that the inward and intensive development pattern required to realise spatial justice has not been realised (Jara, 2010: 69). Instead, those that can afford to do so retreat into the "gated enclaves, office parks, and shopping malls of the suburban margins" (Bremner, 2005: 99). As a result, separation, rather than inclusion, characterises the urban form in Cape Town and hampers transitions to more sustainable forms of urbanism (Figure 1.8). Given this context, it is critical for architectural professionals – if they are to contribute to sustainability transitions – to develop the ability to engage constructively with the informal spatial practice that sustains residents' livelihoods (Low, Sandler & Hugo Hamman, 2005: 13; Kotze, 2017: 2).

Figure 1.8 Separation as an impediment to sustainable urbanism: Manenberg and Lotus Park (LTP) (top left and right), and Sweet Home Farm (SHF) and Vukuzenzele (bottom left and right). Photographs: Miller, J. 2016. Unequal Scenes [Online]. Available: http://www.unequalscenes.com/projects [2018, February 8]

In selecting the live project case studies, I made use of purposive sampling so as to obtain a selection of three informal settlement upgrading interventions in close proximity to each other, representing a range of architectural engagements with 'in[formal]ity'. The interventions were identified by drawing on an existing partnership between DBRS and CORC (a local NGO), as well as by setting up two new partnerships – one with VPUU, a non-profit organisation (NPO) that was previously a programme of the City of Cape Town (COCT) and the Western Cape Government (WCG), and another with UBU, a small community-based organisation (CBO). While all three organisations are active in the same geographical area (Figure 1.9), their respective size, organisational culture, and intervention methodologies result in the live project case studies capturing a range of architectural practices.

The first live project was undertaken in 2015 in collaboration with CORC and entailed the collaborative development of new dwelling typologies in order to support an Upgrading of Informal Settlements Programme (UISP) project application for 38 households in Lwazi Park, Gugulethu. This was the third live project that DBRS and CORC had undertaken together and followed on from a reblocking design process at Vygeskraal and a hostel upgrading design process in Manenberg (both these settlements being in close proximity to the case study locations of this research). These projects were incorporated into the B.Tech. (Architectural Technology) programme, with DBRS and CORC facilitating the collaborative design process between the CPUT students and resident volunteers.

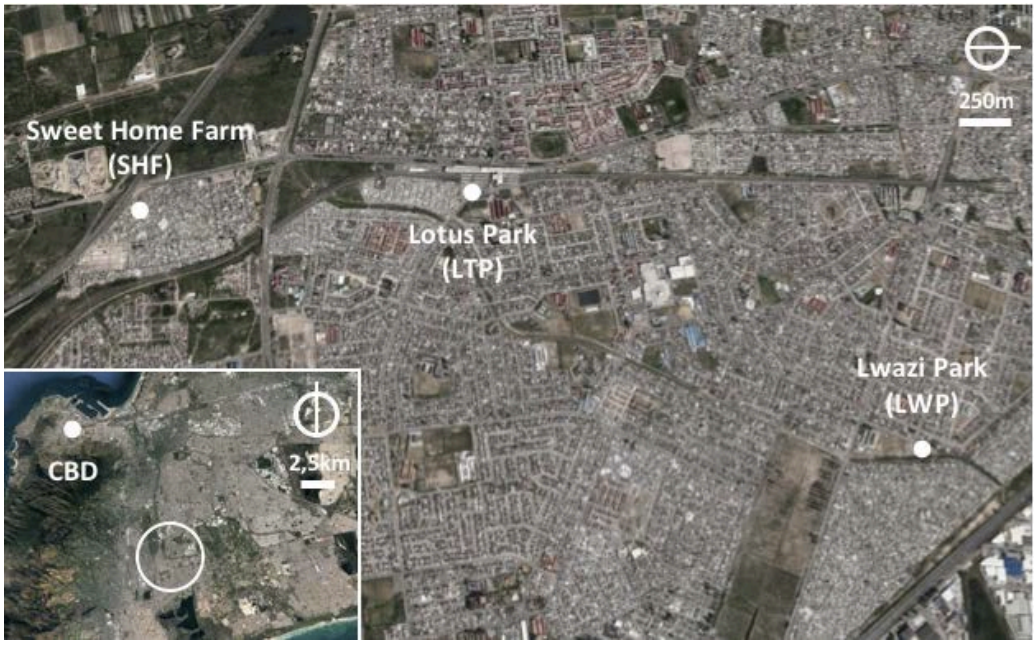

Figure 1.9 The three case study locations, with inset indicating their position in relation to the Cape Town CBD. Photographs: Google Earth, 2017

During 2016, VPUU and DBRS collaborated on the second live project that informs this research, facilitating the collaborative design of a spatial intervention adjacent to a neighbourhood centre (NHC) at Lotus Park, Nyanga. The third live project was undertaken during 2017 in collaboration with UBU and the resident leadership of Sweet Home Farm in Philippi and entailed the adaptation of a self-build dwelling prototype for use as a clinic. In order to ensure sufficient data triangulation, care was taken to select case studies that represent a range of architectural practices in terms of (i) the size and the organisational culture of the organisations within which it was embedded (VPUU being the largest, and UBU the smallest); (ii) the role of architectural practice in their intervention strategy, as well as and the complexity and nature of the strategy (e.g. VPUU has five workstreams, of which only one includes architectural practice, whereas UBU focuses mainly on architectural practice); and (iii) the type of architectural project, i.e. the design of dwelling layouts, the design and construction of a spatial intervention, and the adaptation of an existing typology to a different function. The upgrading interventions that the live projects contribute to were also selected so as to ensure diversity: the further upgrading of a settlement that had already been reblocked (Lwazi Park), the consolidation of a public node so as to support a range of social programmes (Lotus Park), and the development of a self-build dwelling typology to enable residents to upgrade their dwellings themselves (Sweet Home Farm). During and after the live projects, I conducted semi-structured informal interviews with 11 stakeholders, including local government officials, architectural professionals of the organisations concerned, and members of the resident leadership at the three upgraded settlements. Theoretical triangulation is achieved by drawing on multiple theories to contextualise and interpret the data, i.e. by structuring the research aims with reference to the MLP, referring to three perspectives on 'in[formal]ity' as spatial practice, and employing AT concepts and principles in the data analysis (both within and between the three case studies).

1.4.2.3 Delimitations and limitations

As discussed above, I have selected the three live project case studies so as to represent a range of architectural practices, ranging from site layout concept development, reblocking co-design, dwelling typology layouts, the design of a temporary community building, to the design and construction of a small spatial intervention. Accordingly, I have focused on upgrading interventions where architectural professionals have the potential to play a substantial role. This ruled out projects undertaken by the COCT Urbanisation (Informal Settlements) Department (UISD), due to the large-scale and engineering-dominated nature of their interventions[9]. Through my own experience at DBRS, I am also aware of the potential negative impact of short-term, *pro bono* architectural projects on the sustainability of upgrading interventions. As a result, the three live project case studies that inform this research are embedded within existing interventions of local organisations[10], all of which have established collaborative working relationships with the

9 I became aware of this during a discussion with Susan Groenewald of the COCT UISD (pers. comm., 17 March 2015), while seeking to expand the pool of suitable informal settlement upgrading interventions to use as case studies in this research.

10 From here on forward, "local organisations" is understood to include NGOs, CBOs, and NPOs.

resident leadership of the settlements concerned. As such, this research is concerned with the architectural practice that is embedded within upgrading interventions undertaken by local organisations, so as to explore GAP as an emergent mode of architectural practice in transitions to sustainable urbanism. This research does not aim to develop a new model for architectural practice – doing so would require a much larger data set than the three live project case studies that inform this research – but rather to explore the informal capacities that are required and developed when engaging in GAP in the specific context of Cape Town. In doing so, I wish to contribute to the influence of this emergent niche-level practice on the regime of conventional architectural practice, thereby encouraging more architectural professionals to engage with residents in supporting informal settlement upgrading as a transition to sustainable urbanism.

1.4.2.4 Data collection: Live project case studies

In employing live projects as a means of data collection, this research forms part of the South African tradition of more applied intellectual engagement. Oldfield et al. (2004: 287) describes such engagement as providing a suitable platform through which to explore the practices, rationalities, and worldviews of residents. Engaged scholarship enables researchers to focus on everyday actions and negotiations, and to appreciate the many related practices that are involved in these processes. This form of scholarship is sensitive to the oppositional practices of residents toward local government and enables the development of "richly textured narratives" that "thicken our conceptions of urbanism" (Pieterse, 2006: 404-406). Furthermore, it facilitates an understanding of the "contingent universals" of any situation: both the specificities of place, and that which can be shared across other contexts (Healey, 2012: 193). Live projects provide a suitable method for exploring GAP in the context of informal settlement upgrading interventions, as social and environmental sustainability is a priority of most live projects (Butterworth, 2013: 17). As such, live projects connect the world of research with the "real world outside", allowing researchers to engage directly with the complexity of real life so as to learn both the theory and practice of architecture (Butterworth, 2013: 5-9). Live projects allow concepts such as 'social justice' and the 'right to the city' to enter the architectural discourse, as researchers are confronted with the hardships and injustices faced by informal settlement residents. Therefore, such engagement requires architectural professionals to "seek out, appreciate, and respect local knowledge", examine their own values, and develop both a conceptual and an operational understanding of architectural practice (Winckler, 2013: 215).

In navigating the complex ways in which local organisations connect with a mix of residents with specific local identities and interests, live projects come to represent social processes that bind researchers and residents together in the experience of working collaboratively (Oldfield, 2008: 270, 282). As such, live projects are dialogic and inclusive, enabling researchers to develop a critical perspective on architectural practice. By embracing alternative voices, such projects introduce an element of contingency that allows for unexpected and unpredictable occurrences that influence the trajectory of the research intervention (Sara, 2006: 1-3). During and after the

completion of each live project, semi-structured informal interviews were conducted with a range of stakeholders, including local government officials, architectural professionals of the organisations concerned, and members of the resident leadership of each settlement. The semi-structured format of the interviews allowed for informal conversation and enabled research participants to share their experiences of the upgrading intervention in their own voices (Djuraskovic & Arthur, 2010: 1570). This method of interviewing is "consistent with the rhythm and flow of heuristic exploration and search for meaning" (Moustakas, 1990: 47). The initial interviews were transcribed and informed the descriptive narrative and research intervention description of each of the live project case studies presented in chapter 5. They also informed the activity system mapping, which was verified by follow-up interviews[11]. This is in line with the methodological recommendations for heuristic inquiry (Seamon, 2000: n.p.; Hiles, 2001: n.p.) and the verification ensured the quality of the activity system mapping prior to the commencement of the comparative analysis of the empirical findings of the live project case studies.

1.4.2.5 Data analysis: Activity system mapping

As discussed in section 1.4.1, the analysis of the data collected during the live projects is done by means of activity system mapping. When mapping an activity onto the activity system framework (Figure 1.10), the research participant (an individual, two individuals, or a group) is placed in the position of subject, and their agency becomes the point of view employed in the analysis. That which is "acted upon" at the point in time at which the activity is mapped is placed in the position of object and is understood as the "problem space at which the activity is directed, and which is moulded or transformed into an outcome with the help of physical and symbolic, external and internal tools" (Engeström, 1993: 67). In this research, the outcome of the activity always relates to a transition to sustainable urbanism in Cape Town. The relationship between the subject and object is indirect and is mediated by artefacts that can be physical or conceptual, including instruments, signs, and symbols. Together with the contextual and social elements of the activity system (rules, community, and division of labour), artefacts mediate the relationship between the subject and object so as to achieve the desired outcome of the activity. As such, AT understands architectural practice as a complex system of mediated interactions between individuals, communities, and their object of activity (Ferreira, Zdunczyk & Simpson, 2010: 4). AT is concerned not only with "doing", but with "doing in order to transform something" and posits the activity system as the minimum meaningful context for understanding human actions (Engeström, 1993: 67). In third generation AT, the unit of analysis is described as a historically evolving object-oriented and artefact-mediated collective activity system, seen in the context of its network relations to other activity systems (Engeström, 1999c: 6; 2000: 960). In the research presented in this dissertation, I will explore GAP as an activity that occurs across and between the networked activity systems of local government and the residents involved in each of the three upgrading interventions.

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[11] The transcriptions of the initial interviews as well as recordings of the follow-up interviews are available, and the related ethical clearance documentation is included in the appendices.

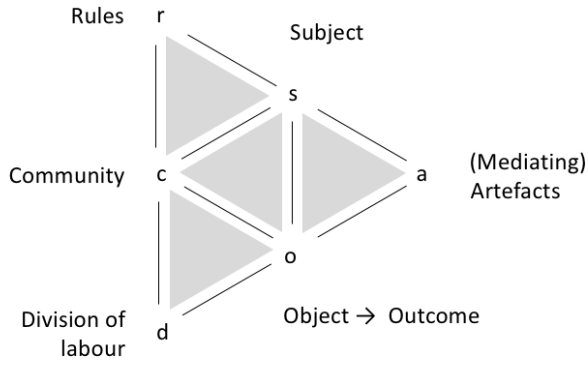

Figure 1.10 The activity system framework: The contextualised activity of a system as a whole. Adapted from Engeström (1991a: 79; 1993: 67)

1.5 Ethical considerations

This research involves various types of interaction with different participants in the live project case studies that were facilitated by DBRS. The main ethical considerations are discussed below, and the related documentation can be found in the appendices.

Subordinate participants

As the candidate architectural technologists who took part in the live projects were students in the B.Tech. (Architectural Technology) programme at CPUT, they were subordinate to me in my capacity as their lecturer. Prior to each live project case study, students were reminded that their participation in the aspects of the project that relate to this research – the writing of reflective journals and the inclusion of samples of their project work – was voluntary, and that they would remain anonymous.

Informed consent

Semi-structured informal interviews were conducted with a selection of participants, including members of the resident leadership as well as architectural professionals employed by the local organisations involved in the upgrading of each informal settlement. All participants who were interviewed were provided with an informed consent form that described the purpose of the research and the interview. Participants had the option to remain anonymous or not to be interviewed at all. Students, whose impressions of the project were captured through reflective journals, remain anonymous and were requested to provide permission for excerpts from their journals to be included in the research.

Organisational consent

The organisations with which I engaged in this research are existing partners of CPUT, and DBRS has concluded memoranda of understanding with Community Organisation Resource Centre

(CORC), Violence Prevention through Urban Upgrading (VPUU), and Ubuhle Bakha Ubuhle (UBU) w.r.t. the live project case studies that inform this research.

Institutional consent

Permission was obtained from the Research Office in the Faculty of Informatics and Design at CPUT for the inclusion of student work produced during the live projects.

1.6 Thesis structure

The structure of the thesis derives from the aims and objectives presented in section 1.3. The thesis comprises six chapters: an introduction (the current chapter), a contextual perspective, an exploration of architectural practice in Cape Town, a theoretical and analytical framework, the case studies, and a synthesis. The organisation of the chapters and sections of the thesis in relation to the aims of the research is indicated below (Table 1.1).

Table 1.1 The relationship between the research aims, and the chapters and sections
Table by author

	Chapter 2 Contextual perspective	**Chapter 3 Architectural practice in Cape Town**	**Chapter 4 Theoretical and analytical framework**	**Chapter 5 Case studies**	**Chapter 6 Synthesis**
Aim 1 Explore the regime level	Chapter 2	Section 3.1	Section 4.1		
Aim 2 Explore the niche level		Section 3.2	Section 4.2 Section 4.3	Chapter 5	
Aim 3 Explore the impact of the niche level on the regime level					Chapter 6

Chapter 2

Contextual perspective

Informal settlement upgrading as a transition to sustainable urbanism

Chapter 2 Contextual perspective
Informal settlement upgrading as a transition to sustainable urbanism

This chapter addresses the first aim of the research presented in this dissertation, which is to explore the regime level of the urban development system. By and large, the spatial practices that underpin formal urban development "physically and conceptually obliterate the reality of millions of local lives" as they disregard the small-scale connections, negotiations, and decisions that residents make daily while sustaining their urban livelihoods (De Boeck, 2012: 319; 2013: 98). Lefebvre (1996: 195) proposes the concept of 'the right to the city' as a means to legitimate "the refusal to allow oneself to be removed from the urban reality by a discriminatory and segregative organisation". The right to the city can be interpreted as the right to participate in society through the everyday practices of work, leisure, family life, and cultural production. As such, it privileges the social in relation to the political and economic, and allows residents full participation in society. This right is not granted by those who hold power, but is established and continually redefined through social relations (Gilbert & Dikeç, 2008: 259). Furthermore, it includes the right to appropriate urban space – by formal or informal means – as well as the right to full participation in all decisions that produce urban space (Mwathunga, 2014: 5). In doing so, the right to the city enables residents to use the city "as an arena of mutable aspirations" (Simone, 2010b: 59).

In South Africa, realising this right will require fundamental changes to the neoliberal dynamics that underpin formal urban development (Mbembe & Nuttall, 2004: 347). Notwithstanding this, it is the presence of residents themselves, and their varied uses of one another as instruments to realise particular aspirations, that provides the impetus for the realisation of the right to the city (Simone, 2010b: 59). The right to the city challenges the hegemony of dominant social groups, as hegemony does not exist by itself as a form of dominance, but must be continually "renewed, recreated, defended, and modified" (Williams, 1977: 112). As such, it is possible for residents to resist, limit, and challenge the hegemony of local government. This involves paying attention to post-apartheid government's efforts to "tame community participation and control the claims of citizens on the state" (Miraftab, 2004: 253), and developing an understanding of the relations between local government and residents, so as to inform action with the potential to effect changes in the power relations between them (Oldfield et al., 2004: 290). In order to develop such an understanding, this chapter draws on literature pertaining to the policy and legislative context that informs informal settlement upgrading, upgrading perspectives and local practice, and urban governance in Cape Town.

2.1 Policy and legislative context

In the light of the normative position that has been established in relation to sustainable urbanism in section 1.1, it is clear that the nature of the relationship between local government and residents will determine if a particular informal settlement upgrading intervention does indeed constitute a transition to sustainable urbanism. A nuanced understanding of this relationship is offered by Huchzermeyer and Karam's (2006: 22) classification of government policies that pertain to informal settlements. Based on their classification, there are four views on upgrading strategies (Combrinck, 2015: 133):

- A pejorative view that supports forced evictions, eradication, and demolition.
- A problem-based view that informs a solutions-driven approach and aims to replace informal norms and standards with those of the dominant formal value system.
- A pragmatic view that involves consensus-based improvement and regularisation, grounded on an incremental approach to formalisation.
- A radical view that favours *in situ* transformation, with terms established by residents themselves.

The first two views both reflect an anti-urban modernist bias, and it is clear that the pejorative view does not constitute a socially just transition to sustainable urbanism. In South Africa, the problem-based view leads to a self-perpetuating cycle of housing problem to solution, and back to problem again. In their uncritical implementation of the apartheid housing delivery model, all tiers of government (national, provincial, and local) have perpetuated the housing problem. They have done so by implementing the same mechanism of reductionist design, aimed at quantity rather than quality. The architectural profession's response to this has been limited to proposing alternative design typologies and technological resolution for individual dwellings, as well as incorporating incremental extension over time. As such, it is evident that the boundaries of architectural practice are also determined by the conservative nature of those who commission projects, with risk-averse local governments preferring established practices and delivery methods. However, such quantitative and solutions-driven approaches to upgrading only widen the gap between local government and residents (De Klerk, 2016: 52). Ultimately, without collaboration with residents themselves, the potential that exists for creative and meaningful informal settlement upgrading will not be realised (Combrinck, 2015: 143-145).

In this regard, the pragmatic and radical views on informal settlement upgrading offer a more collaborative and socially just perspective on upgrading strategies (Table 2.1). According to both these views, it is incumbent upon architectural professionals to interact with informal spatial practice and to appreciate the legitimate power that it represents (Combrinck, 2015: 157). If the legitimacy of informal spatial practice is not recognised, incremental upgrading is reduced to a strategy that local government employs merely to stabilise and formalise an uncontrolled set of activities (Napier, 2002: 28). In such a scenario, informal spatial practice is effectively co-opted to serve the interest of the formal system. The position of architectural professionals in this context is made more difficult by the fact that they are generally not trained to facilitate participatory processes aimed at empowering residents. If architectural professionals wish to challenge the organisation and spatial relations – in particular those between local government and residents – that characterise the urban environment, they have no choice but to engage with the "messy, sometimes dangerous conditions necessary for freedom and the establishment of true democracy" (Combrinck, 2015: 33-34, 160). The case studies that are drawn on in the research reported on in this dissertation represent a combination of the pragmatic and radical views on informal settlement upgrading, and as such constitute transitions to sustainable urbanism.

Upgrading interventions informed by the type of engagement discussed above do however need to be cognisant of the policy and legislative context that informs and constrains the upgrading practice of the different tiers of government. The South African government defines itself as a developmental state that is committed to the structural transformation of the economy in order to address the injustices that still pervade the country. However, there is a disjuncture between policy and practice that can be traced back to the political settlement negotiated during the transition to democracy between 1990 and 1994. The policy choices made since then – in attempting to rapidly stimulate growth and so address inequality – were neoliberal in nature and have led to non-developmental welfarism being implemented on an enormous scale in order to quell social unrest[1] (Swilling et al., 2015: 11). While this strategy (supported by debt-financed consumerism) has stabilised the middle class, it has had disastrous effects on the "bioeconomy": natural resources and the "bodies of the poor" (Khan, 2013: 572). This narrow focus on poverty reduction has also contributed to a growing disjuncture between the discourse on urban climate resilience and issues of informal spatial practice (Brown et al., 2014: 7). Spatial policy has shifted from treating land and space as instruments of social engineering to a more diffuse and ambivalent position, recognising past injustices but not providing an overarching strategy to address them. As such, initiatives are often taken in a piecemeal and half-hearted manner (Todes & Turok, 2017:14). Furthermore, with the African National Congress (ANC) leadership having established themselves as the new political elite, the incentive to radically address persistent injustice has disappeared. Therefore, the responsibility falls to civil society to adopt pragmatic plans to do so (Pillay, 2017: n.p.).

1 Social welfare grants have increased five-fold between 2000 / 2001 and 2011 / 2012, from 3 million to over 16 million (Swilling et al., 2015:12).

Table 2.1 The pragmatic and radical views on upgrading strategies
Table by author, based on Ewing & Mammon (2010: 43, 49), Fieuw (2011: 40-41) and Combrinck (2015: 147-160)

Pragmatic view	Radical view
Consensus-based improvement and regularisation grounded on incremental upgrading, with local government providing appropriate infrastructure for future development.	Favours *in situ* transformation, with residents realising their right to the city by establishing the terms of future development.
Appreciates the transitional role of informal settlements in urban development, and sees informal dwelling as a survival strategy while awaiting full integration into the formal system.	Appreciates the fragile nature of informal settlement livelihood strategies, and promotes efficient and mixed land use by encouraging a spatial strategy of *in situ* densification.
Combination of formal and informal processes, with the legitimate power of the latter recognised.	Combination of formal and informal processes, with the latter enjoying dominance.
Employs approaches that encourage participation of residents in decision-making processes (e.g. assisted self-help housing).	Employs approaches in which residents appropriate and participate in decision-making processes (e.g. reblocking).
Relationships between stakeholders mediated by local organisations (CBOs, NGOs, or NPOs).	Relationships between stakeholders mediated by local organisations (CBOs, NGOs, or NPOs).

2.1.1 National government

In order to apply the critique above to transitions to sustainable urbanism in Cape Town, I will now present, in table format and in chronological order, the policy and legislative context that informs informal settlement upgrading at each tier of government, drawing attention to the intent as well as the outcome of each policy or law. The interrelations between the programmes, processes, and legislation that constitute this context are indicated in Figure 2.1. The first generation of post-democracy housing policy and legislation – discussed in Tables 2.2 to 2.6 – included the Botshabelo Accord, Reconstruction and Development Programme (RDP), the Constitution, the Housing Act, and the People's Housing Process (PHP).

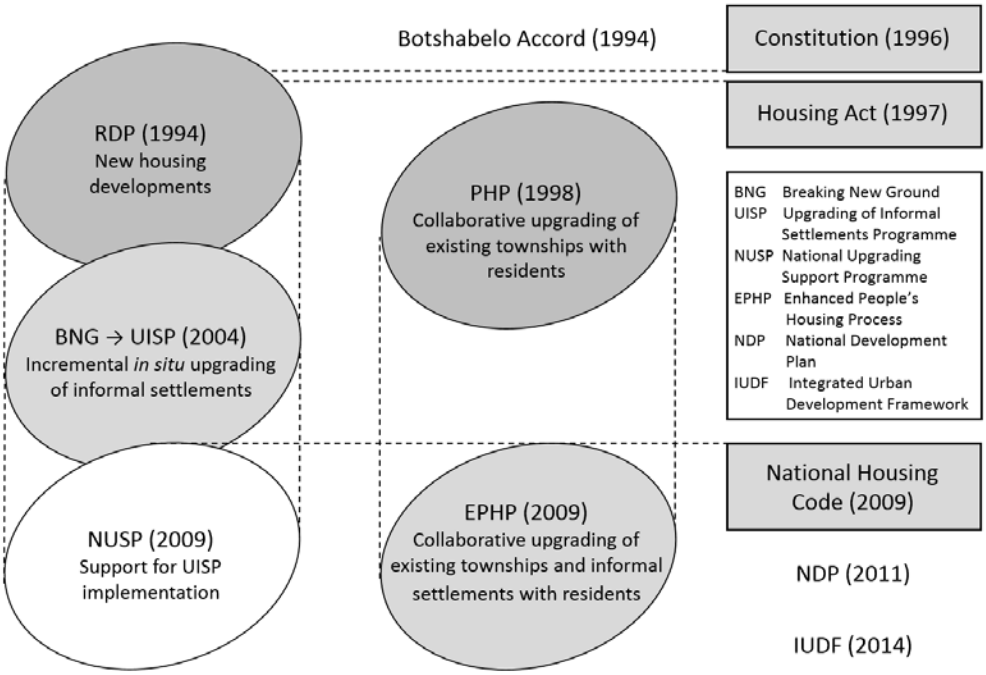

Figure 2.1 Policy and legislative context relating to housing at national government level, organised into programmes, processes, and legislation
Diagram by author

Table 2.2 Botshabelo Accord (1994)
Table by author, based on Bolnick & Bradlow (2010: 35), Cooke (2014: 26), and Turok (2016a: 412)

Botshabelo Accord (1994)	
Commitment by all housing sector stakeholders to assist government in providing support to poor urban residents in their efforts to house themselves. Agreement facilitated by the National Department of Housing (NDOH) and premised on the idea of partnerships between the formal and informal sector.	
Intent	**Outcome**
To foster a more inclusive and holistic approach to housing that involves all relevant stakeholders and looks beyond the delivery of individual dwelling units. This intent is evident in the later renaming of the NDOH to the National Department of Human Settlements (NDOHS).	Implementation of this approach is challenged by the assumption that *in situ* upgrading is an inferior solution to "delivering" individual dwelling units. This led to housing changing from the intended human-centred process to an administrative one that marginalises residents (cf. the RDP, discussed in the next table).

Table 2.3 Reconstruction and Development Programme (1994)
Table by author, based on Charlton & Kihato (2006: 255), Watson (2007: 68-69), Bolnick & Bradlow (2010: 36), SA SDI Alliance (2011: 2), Newton (2013: 641), Gilbert (2014: 254), Isandla Institute (2014a: 2), Marais & Cloete (2014: 48, 51), and Cirolia et al. (2016: 7)

Reconstruction and Development Programme (RDP) (1994)	
Provision of once-off project-linked capital subsidies for new dwelling units for poor urban residents, with a fixed subsidy amount per unit including the cost of land and bulk infrastructure. Implemented between 1994 and 2004, after which it was replaced by the Breaking New Ground (BNG) policy.	
Intent	**Outcome**
To address spatial inequality by relocating and replacing informal settlements with large-scale housing projects. The dwelling units provided were "a first step on the housing ladder" and could be extended and improved over time.	Three million dwelling units of substandard size and quality on the urban periphery. Beneficiaries' social networks, livelihood strategies, and access to urban amenities were disrupted, and the top-down, tightly controlled projects excluded almost all stakeholders other than government officials, local politicians, and the private sector.

Table 2.4 Constitution of South Africa (1996)
Table by author, based on Huchzermeyer (2011: 11) and Ziblim (2013: 19-20)

Constitution of South Africa (1996)	
Forms the basis for law and government in South Africa, and is one of the most progressive pieces of legislation in the world as far as socio-economic rights in relation to adequate housing is concerned.	
Intent	**Outcome**
Article 26 of the Constitution directs government to "take reasonable legislative and other measures within its available resources to achieve the progressive realisation" of the right to adequate housing. This article also prohibits eviction from or the demolition of dwellings without a court order that considers all relevant circumstances.	In 2000, the second socio-economic rights case brought to the South African Constitutional Court (on behalf of Irene Grootboom, who occupied land in Cape Town without authorisation) received a favourable ruling based on the qualified right to housing and protection against arbitrary eviction provided in the Constitution. This provides legal precedent for local organisations and residents to challenge evictions by local government.

Table 2.5 Housing Act (1997)
Table by author, based on Selmeczi (2011: 65), Marais & Ntema (2013: 86), Ziblim (2013: 21-22), and Marais & Cloete (2014: 49)

Housing Act (1997)	
Compels local government to ensure pro-poor, non-discriminatory, racially integrated, and participatory processes of informal settlement upgrading, and enables home ownership by means of a capital subsidy programme that includes substantial private sector involvement.	
Intent	**Outcome**
To facilitate a sustainable process of housing development, so as to realise the right to adequate housing included in the Constitution by means of individual home ownership. A target of one million dwelling units was set for the first five years after the implementation of the act.	The focus on home ownership required a delicate balance between pressure to provide a sufficient number of dwelling units and the economic capacity of the national budget. This neoliberal and technical approach strongly resists the upgrading of informal settlements, and results in the denial of basic services to their residents.

Table 2.6 People's Housing Process (PHP) (1998)
Table by author, based on Pieterse (2008: 114), Bolnick (2009: 7), Newton (2013: 639-648), Newton & Schuermans (2013: 579), Cooke (2014: 26), and Cirolia et al. (2016: 7)

People's Housing Process (PHP) (1998)	
In the 1980s and early 1990s, this process was informed by local organisations that worked closely with residents to develop savings schemes and self-help housing in the absence of government support. The concept of 'assisted self-help housing' included training grants, technical assistance, and capacity building facilitated by organisations such as the Federation of the Urban and Rural Poor (FEDUP). Potential beneficiaries had to contribute to a savings scheme in order to access the capital subsidy for a dwelling unit. The subsidy scheme was revised in 2002 to include a financial contribution from beneficiaries themselves, which could be provided in cash (around ZAR 2 500) or as sweat equity.	
Intent	**Outcome**
To supplement RDP housing by facilitating the upgrading of existing townships in collaboration with residents, so as to realise the meaning of housing as a background to daily life. The PHP is a flexible process enabling the construction of better dwelling units, as well as the incremental upgrading of dwelling units over time. It was also intended to support skills development, stimulate local economies, create a sense of community and ownership, and empower residents to develop sustainable livelihoods.	The 15 000 dwelling units built with assisted self-help were of much better quality than those of the RDP. However, the subsidy instrument and focus on delivery embedded in both the RDP and PHP favours formal townships and the private sector, and limits capacity building and the empowerment of residents. The 2002 revision led to large-scale abuse by private sector developers, who used the PHP subsidies for contractor-led developments. This reduced the role of beneficiaries from being in control of the process to being mere labourers.

A comprehensive review of all housing programmes in 2004 led to the promulgation of revised housing policy that recognised the unintended consequences of the RDP. The latter included housing developments on the urban periphery, substandard construction quality, insufficient beneficiary participation, an increasing housing backlog, corruption and maladministration, and the subsequent continued growth of informal settlements. For the first time, policy measures for the incremental upgrading of informal settlements (many of which are better located than peripheral housing developments in terms of livelihood opportunities and urban amenities) were included, with an ambitious target to eradicate all informal settlements by 2014 (Ziblim, 2013: 24; Isandla Institute, 2014a: 2; Moore, 2016). These policy measures included Breaking New Ground (BNG), the National Housing Code, the National Upgrading Support Programme (NUSP), and an enhanced version of the PHP (as described in Tables 2.7 to 2.11).

Table 2.7 Breaking New Ground (BNG) (2004)
Table by author, based on Bolnick (2009: 5), Huchzermeyer (2011: 33), Fieuw (2013: 67), Isandla Institute (2014b: 10), Marais & Cloete (2014: 51), Massey (2014: 291), Cirolia et al. (2016: 7-8), and Swilling, Tavener-Smith, Keller, Van der Heyde & Wessels (2016: 262)

Breaking New Ground (BNG) (2004)	
This comprehensive plan for the development of sustainable human settlements represented a new paradigm towards informal settlement upgrading. While still based on a market-driven approach to housing, this plan introduced locally constructed social compacts, and capacity building and organisation building were envisioned as central to the implementation of upgrading projects. The plan included new programmes to broaden the scope of housing practice: (i) the Emergency Housing Programme; (ii) the Integrated Residential Development Programme, replacing the RDP project-linked subsidy; and (iii) the Upgrading of Informal Settlements Programme (UISP). The latter programme is relevant to the emergent mode of architectural practice that the research reported on in this dissertation is concerned with.	
Intent	**Outcome**
To promote a shift from a paradigm of conflict and neglect to one of incorporation and cooperation of informal settlements, so as to encourage the large-scale establishment of integrated and sustainable human settlements. Flexible and resident-driven incremental *in situ* upgrading projects would replace the commoditised delivery of peripheral housing. The co-production of development plans and outcomes would deepen democracy and promote active citizenship, with residents developing "responsive, intelligible, affordable, and inclusive solutions" to replace developer-driven delivery mechanisms. BNG was also designed to encourage the private sector (which had become loathe to participate in housing projects due to low project margins) to return to the subsidised housing market.	A lack of attention to institutionalisation (the building of institutional support for large-scale change) contributed to the minimal embrace of incremental and participatory *in situ* informal settlement upgrading. Instead of the acceptance of informal settlements implied in the policy, the focus of government in relation to informal settlements has shifted to an overemphasis on "eradication". At local government level, BNG policy was seldom implemented as intended and the practice of informal settlement demolition and relocation, often accompanied by forced evictions, continued. The N2 Gateway mega-project in Cape Town (discussed later in subsection 2.1.3) provides evidence to this effect.

Table 2.8 Upgrading of Informal Settlements Programme (UISP) (2004)
Table by author, based on Bolnick (2009: 6), RSA (2012: n.p.), Ziblim (2013: 26, 32-36), Massey (2014: 291), SA SDI Alliance & CORC (2015: 52), Cirolia et al. (2016: 7-8), Combrinck & Bennett (2016: 306), Swilling et al. (2016: 262), and Du Preez (2017: 11)

Upgrading of Informal Settlements Programme (UISP) (2004)	
Allows for incremental *in situ* upgrading and development of informal settlements in four phases: community participation, planning and design, supply of basic services and tenure security, and housing consolidation. Design principles for each project are established after careful consideration of all local factors and technical possibilities, and social inclusion and participation are promoted through a multifaceted and interconnected strategy that addresses tenure security, health and safety, and empowerment. In contrast to RDP projects, funding is allocated to local government as a project grant, rather than being awarded to individual households as a housing subsidy. The funding allows for the entire upgrading process, from land purchase and township proclamation, partnership building, planning and design, and infrastructure installation. By virtue of the limited scale of such upgrading interventions, there is ample opportunity for the employment of local skilled and manual labour.	
Intent	**Outcome**
To prevent the marginalisation of residents by avoiding relocation to the urban periphery. Where settlements are too small to accommodate all residents after upgrading, funding is provided for the purchase and development of suitable (ideally adjacent) land to accommodate the overflow. The overall intent of the UISP is to enable residents to manage upgrading interventions themselves. It encourages sustainable informal settlement upgrading by employing a more indirect, holistic, and multi-sectoral approach that addresses the structural causes of informal settlement formation. Upgrading interventions are intended to be multi-stakeholder initiatives undertaken in partnership with residents, with local government taking on the role of developer and liaising with all stakeholders, including architectural professionals, as the project progresses.	Implementation has been hindered by several challenges, including a lack of skills, administrative capacity and leadership, and the resultant failure of local government to adhere to the principles of *in situ* upgrading. The UISP facilitates the well-balanced involvement of all stakeholders (local government, residents, and built environment professionals). However, failure to implement the UISP has led to increased dissatisfaction and service delivery protests. There is a disjuncture between policy and implementation, with participation reduced to "nothing more than an administrative façade" and implementation taking place in a "crude top-down fashion with nominal regard for participatory processes" (Ziblim, 2013: 36). The intended indirect approach has been replaced by direct and often repressive approaches to eradicate informal settlements. Even when implementation follows the intent of the programme, upgrading is a long and frustrating process that takes as long as eight years to deliver basic services.

Table 2.9 National Housing Code (2009)
Table by author, based on Ziblim (2013: 25) and Isandla Institute (2104a: 4; 2014b: 4)

National Housing Code (2009)	
Requires informal settlement upgrading to be based on a pragmatic perspective that is cognisant of the uncertain and changing realities of informal settlements. The code allows for the National Upgrading Support Programme (NUSP) and Enhanced People's Housing Process (EPHP).	
Intent	**Outcome**
To foster strong relationships between local government, residents and their local organisation partners, as these relationships are crucial to the facilitation of participatory processes and capacity building.	Establishment of measures to address the misuse of the PHP as well as the implementation challenges to the UISP.

Table 2.10 National Upgrading Support Programme (2009)
Table by author, based on RSA (2012: n.p.), Cooke (2014: 27), Isandla Institute (2014a: 4), Cirolia et al. (2016: 8), Combrinck & Bennett (2016: 305), and Zondo & Royston (2016)

National Upgrading Support Programme (NUSP) (2009)	
NUSP provides institutional support to address the disappointing implementation of BNG, and in particular the UISP. The programme is complemented by flexible financial instruments, including the Urban Settlements Development Grant (USDG). A High Court judgement on the Slovo Park upgrading in Johannesburg during 2016, which ruled that the UISP is binding on local government and that attempts to evict and relocate informal settlement residents (in lieu of *in situ* upgrading) are in breach of both the Constitution and the Housing Act. Given the precedent set by this judgement, it is crucial to overcome the challenges that hinder the implementation of the UISP.	
Intent	**Outcome**
Providing technical assistance to local government to enable planning in collaboration with residents. NUSP includes a capacity building programme for local government officials to understand and address the requirements of incremental *in situ* informal settlement upgrading processes. It also promotes the development of social competencies that enable local government officials to facilitate participatory processes and to negotiate between varying interests.	NUSP faces the same challenges as the UISP: local government officials and private sector developers with limited experience of participatory planning who are unsympathetic towards *in situ* upgrading processes, the absence of a multidisciplinary approach capable of integrating social and technical concerns, and a lack of capacity on the part of local government officials and built environment professionals in relation to the requirements of *in situ* upgrading.

Table 2.11 Enhanced People's Housing Process (EPHP) (2009)
Table by author, based on Newton (2013: 549-650), WCG (2015c), and Combrinck, Vosloo & Osman (2017: 33)

Enhanced People's Housing Process (EPHP) (2009)	
In response to misuse of the PHP by private sector developers, a reference group was established by local organisations in 2004 to inform the evolution of the EPHP, which reiterated the importance of people-centred approaches and local project ownership. The EPHP applies to the *in situ* upgrading of existing townships as well as informal settlements, with beneficiaries initiating and driving the process in partnership with local organisations and provincial and local government.	
Intent	**Outcome**
Beneficiaries were still required to contribute to the construction of dwelling units, and were to be actively involved in decisions regarding both the housing process and product. The EPHP was intended to collaborate with local initiatives and promote empowerment through skills transfer.	The number of dwelling units realised through the EPHP remains limited. This is inherent to the contextualised nature of the approach, which results in a complex process that is challenging to both residents and local government.

In situ upgrading was also recognised in the National Development Plan (NDP, see Table 2.12) and the Integrated Urban Development Framework (IUDF, see Table 2.13).

Table 2.12 National Development Plan (2011)
Table by author, based on NPC (2012: 259), Isandla Institute (2014a: 6), SA SDI Alliance & CORC (2015: 19), Pieterse & Cirolia (2016: 455), and Turok (2016b: n.p.)

National Development Plan (NDP) (2011)	
Makes a strong case for clearer policy direction on urbanisation in order to promote more compact and integrated human settlements, and aims to reduce disagreements between provincial and local government. This plan includes a recommendation for the upgrading of all informal settlements that are on suitable, well-located land by 2030. The NDP recognises that former housing policies based on the provision of subsidy housing to qualifying beneficiaries have dampened the will of residents to initiate and take part in *in situ* upgrading projects.	
Intent	**Outcome**
The NDP regards residents as active agents with valuable knowledge and experience that allow them to contribute to upgrading interventions. Responsibility for spatial planning and land-use control is assigned to local government so as to improve spatial integration and alignment of housing projects with other urban infrastructure.	Informed the Medium Term Strategic Framework (MTSF) for the electoral period 2014-2019, which has a target of improving the living conditions of 1.5 million households by 2019.

Table 2.13 Integrated Urban Development Framework (IUDF) (2014)
Table by author, based on Isandla Institute (2014a: 4) and Pieterse & Cirolia (2016: 453-461)

Integrated Urban Development Framework (IUDF) (2014)	
Promotes a participatory development and empowerment agenda that argues in favour of substantive communication between local government and residents. Whilst doing so, it remains cognisant of the limited capacity of local government officials to engage meaningfully with residents, as well as of the adverse effect of low education levels on participatory processes. The framework builds on the work of local organisations and includes training, capacitation, decision-making, and economic mobilisation.	
Intent	**Outcome**
Aims to encourage a shift towards more just and democratic housing processes, and the incremental upgrading of shared facilities (as opposed to housing delivery on an individual basis). Recognises that it is impossible to address the challenges of housing and informal settlement upgrading through policy alone, and aims to create space for multiple forms of engagement (e.g. direct action and agitation).	The implementation of the UIDF is undertaken according to a three-year implementation plan (2016-2019), and as such it is not possible to evaluate the outcome thereof at present.

Both the RDP and UISP – the latter despite allowing for the incremental *in situ* upgrading of informal settlements – define informal spatial practice as a problem that requires a requisite solution in the form of housing provision (Combrinck et al., 2017a: 48). However, the PHP's focus on the collaborative upgrading of existing townships was, in the form of the EPHP, expanded to include the *in situ* upgrading of informal settlements (Figure 2.3). Notwithstanding this, the provision of subsidy housing to qualifying beneficiaries in the RDP dampened the will of residents to initiate and participate in *in situ* upgrading projects. This exacerbated the challenge that insufficient capacity at local government level posed to the successful implementation of the *in situ* upgrading of informal settlements as envisioned in the UISP and NUSP. As such, residents themselves remain the main contributor to housing stock in South Africa, albeit in the form of shack dwellings.

2.1.2 Provincial government

In the Western Cape, provincial government policy development relating to informal settlement upgrading has lagged behind that of national government (see Tables 2.14 to 2.16). In a number of cases (particularly during the Hangberg informal settlement upgrading in Hout Bay, Cape Town, in 2011) the provincial government's approach displayed an inherent inability or unwillingness to successfully facilitate a democratic, participatory upgrading process. Instead, its conduct was characterised by violent control after several attempts at negotiations with all stakeholders had failed (Fieuw, 2011: 131; Combrinck et al., 2017a: 47). A reliance on external entities to compile policy guidelines also points to a lack of capacity and knowledge of informal settlement upgrading.

Table 2.14 Western Cape Provincial Spatial Development Framework (PSDF) (2014)
Table by author, based on WCG (2014: 89; 2015b: 4-6)

Western Cape Provincial Spatial Development Framework (PSDF) (2014)	
Directs the private sector in relation to desired development directions.	
Intent	**Outcome**
To improve the quality of the public environment in informal settlements.	Increased emphasis on incremental upgrading in partnership with residents and the private sector.

Table 2.15 Informal Settlement Support Plan (ISSP) (2016)
Table by author, based on Habitat for Humanity SA (2016; 2017: 3)

Informal Settlement Support Plan (ISSP) (2016)	
Developed for the WCG by the Isandla Institute, Palmer Development Group, and Habitat for Humanity SA to provide strategic direction for the design and implementation of incremental *in situ* upgrading interventions.	
Intent	**Outcome**
To guide local government processes aimed at incremental *in situ* informal settlement upgrading, and to promote self-help development facilitated by intermediary organisations.	Implementation commenced in 2017.

Table 2.16 Human Settlements Framework (HSF) (2016)
Table by author, based on WCG (2016: 3) and Habitat for Humanity SA (2017: 3)

Human Settlements Framework (HSF) (2016)	
Developed for the WCG by the African Centre for Cities (ACC) to serve as a roadmap to sustainable, integrated, and resilient human settlement development, with a specific focus on the changing role of local government in the "delivery" of human settlements.	
Intent	**Outcome**
To explore innovative human settlement solutions as "test beds" to influence future policy, to identify levers to encourage partnerships with residents and the private sector, and to provide guidance on potential typologies for informal spatial practice.	Implementation commenced in 2017.

2.1.3 Local government

The responsibility for implementing informal settlement upgrading policy has to a large extent been devolved to local government. However, the divergent values and ideologies that underpin the strategy and action plans of different departments and tiers of government have been an impediment to cooperation, and point to the tension between a desire for comprehensive, systemic change and a desire for participatory and democratically acceptable strategies. The wide range of approaches clustered under the term "sustainable development" has, however, led to both local government and resident groups being seen as homogenous entities in the policies and programmes intended to guide transitions to sustainable development, from the constitution through to provincial and local integrated development plans (IDPs) and spatial development frameworks (SDFs) (Patel, 2004: 285, 292).

In this subsection, I will refer first to local government programmes and plans aimed at transitions to sustainable urbanism, and then discuss the local implementation of the UISP in Cape Town. A brief description of each programme and plan, as well as its intent and outcome, is provided in Tables 2.17 to 2.22.

Table 2.17 Dignified Places Programme (DPP) (1998)
Table by author, based on Southworth (2003: 130-132; 2010: 103-106)

Dignified Places Programme (DPP) (1998)	
Aimed at upgrading urban public spaces in townships on the Cape Flats. This programme strove to enable residents to choose the way in which they inhabited and interpreted public spaces, and employed a strategy of minimalism – allowing freedom and flexibility to residents in interpreting, inhabiting, and adding to the projects – rather than comprehensive interventions. The programme was underpinned by spatial principles that included placemaking ("urban acupuncture" that draws on existing activities on the site), integration (public elements clustered into combined projects to improve accessibility, convenience, and efficient management), and generative capacity (providing a range of spatial opportunities for both formal and informal activities).	
Intent	**Outcome**
To enable and promote intensity, diversity, and complexity; address the spatial legacy of spatial, social, and institutional fragmentation; and enable a sense of place by celebrating important civic institutions and collective activities.	Projects were actively supported by residents by virtue of their benefit to the collective rather than to individuals. The programme also illustrates the value of employing flexible, performance-driven design principles rather than rigid design codes.

Table 2.18 Violence Prevention through Urban Upgrading (VPUU) (2005)
Table by author, based on Krause (2008: 103), Cooke (2011b: 18), Uğur (2014: 115), Ewing (2015: 28), and VPUU (2016)

Violence Prevention through Urban Upgrading (VPUU) (2005)	
VPUU originated as a joint project of the COCT, the German Development Bank, the SA National Treasury, and Khayelitsha residents. The programme consists of five work streams, one of which (the Situational Crime Prevention (Built Environment) work stream) focuses on the design and implementation of spatial interventions to support the work of the other work streams. These interventions include safe walkways and public spaces, small neighbourhood buildings, sports facilities, parks, cultural facilities, libraries, and business premises.	
Intent	**Outcome**
VPUU aims at safe and integrated communities, citizenship, pride, and the improvement of quality of life for all residents in local neighbourhoods, and has a mandate to negotiate solutions between residents and local government. The programme has a research-based approach that incorporates international best practice, combined with the concept of 'asset-based development' so as to ensure that interventions are locally owned and determined.	While residents and their leadership are able to adapt to this incremental, participation-driven approach, it poses challenges to the COCT and its governmentality based on budget expenditure and infrastructure development. The first phases of the programme were implemented in the Harare district of Khayelitsha, and the project partnership has since been extended to include the WCG, international agencies, and local organisations. Since 2010, the programme has been piloted in a number of informal settlements in Cape Town.

Table 2.19 Integrated Development Plan (IDP) (2012)
Table by author, based on Miraftab (2007: 604), Fieuw (2011: 55), Massey (2013a: 608), and Isandla Institute (2014c: 5)

Integrated Development Plan (IDP) (2012)	
The five-year IDP (2012-2017) is the primary guide for spatial development by the COCT, and includes the expanded responsibilities relating to human settlement development and informal settlement upgrading that are imposed on local government by national government policies such as the UISP and EPHP.	
Intent	**Outcome**
To encourage entrepreneurial local government practice in order to finance the expanded responsibilities imposed by national government.	Contracting out of consulting services to private entities with little grasp of or sympathy for the complexities of informal settlement upgrading, and that resort to purely technocratic approaches as a result.

Table 2.20 Informal Settlement Transformation Programme (ISTP) (2012)
Table by author, based on SUN Development (2012: 13), Abrahams (2013: n.p.), and Uğur (2014: 163-165)

Informal Settlement Transformation Programme (ISTP) (2012)	
Incremental programme to transform informal settlements with an experimental *in situ* developmental approach, that is being piloted in five informal settlements in Cape Town. It is informed by the VPUU methodology, which relies on effective cooperation between local government departments, and aims to ensure a sustainable built environment where residents are less dependent on local government.	
Intent	**Outcome**
To facilitate the participatory incremental upgrading of existing informal settlements with minimum relocation of residents, in order to promote safe and integrated settlements that help to overcome social, cultural, institutional, economic, and spatial exclusion. The programme aims to improve overall quality of life as opposed to a narrow focus on infrastructure provision, and allows intermediary organisations to facilitate communication between residents and local government.	The programme has indicated the need to adapt formal legal systems (particularly zoning schemes) when used for *in situ* upgrading, as they are not directly compatible with the needs of such interventions. Recommendations have been made to review existing laws and regulations and to determine what scope there is to modify them to apply to unconventional situations, and thereby making them more flexible.

Table 2.21 Mayoral Urban Renewal Programme (MURP) (2012)
Table by author, based on COCT (2012), Ziblim (2013: 39), and Uğur (2014: 170)

Mayoral Urban Renewal Programme (MURP) (2012)	
This programme pays particular attention to the upgrading and improvement of public spaces in areas that have been identified as neglected and dysfunctional, including informal settlements.	
Intent	**Outcome**
As part of the MURP, VPUU was tasked with implementing the methodology they developed in Khayelitsha in a number of informal settlement pilot projects so as to upgrade and improve public spaces.	Informal settlements have to be identified as a priority project on the COCT IDP in order to qualify for upgrading. This has encouraged a culture of service delivery protests – essentially, the most vocal and problematic settlements are added to the upgrading list first.

Table 2.22 Proactive Reblocking Policy (2013)
Table by author, based on COCT (2013: 6-11), SA SDI Alliance (2013a), Cooke (2014: 26-27), and SA SDI Alliance & CORC (2015: 37)

Proactive Reblocking Policy (2013)	
This policy is informed by grassroots reblocking practices supported by CORC and the Informal Settlements Network (ISN). It offers a means to implement the UISP and to address the COCT IDP objective of providing improved services to informal settlement residents. The policy further addresses the imperatives of both the BNG and NDP that relate to the upgrading of informal settlements in collaboration with residents. Provision is made for project steering committees (PSCs) consisting of representatives of both internal and external stakeholders. The PSCs will play a central role in the facilitation and coordination of *in situ* upgrading projects, with the COCT UISD driving the overall reblocking initiative in collaboration with residents and local organisations. The latter are intended to act as intermediaries between residents and local government, in addition to facilitating horizontal peer-to-peer learning, donor funding, and resident-driven mapping and enumeration processes.	
Intent	**Outcome**
To enable the reconfiguration of informal settlements according to a spatial framework determined by residents themselves, so as to allow for improved vehicular access and the installation of service infrastructure as a first step in the incremental *in situ* upgrading process.	Collaborative reblocking of a number of informal settlements as pilot projects, including Mtshini Wam (in Milnerton), Kuku Town (in Kensington), and Flamingo Crescent (in Lansdowne).

Despite it having been incorporated into local government policy – and successfully piloted in a number of settlements (see Figure 2.2) – reblocking is not the most prevalent form of informal settlement upgrading in Cape Town. As discussed above, local government generally lacks the professional skills and experience to engage in complex *in situ* upgrading processes, and the COCT often resorts to the creation of temporary relocation areas (TRAs) where they can "decant" residents while upgrading projects are underway. This practice is controversial for a variety of reasons: a lack of participatory planning, the resultant disruption of livelihood strategies and social networks; an absence of basic services such as electricity, water, and sanitation at relocation sites; as well as the peripheral location, scale, and duration of relocation (Ziblim, 2013: 33; Turok, 2016a: 413). Informal settlement residents observe the establishment of TRAs with reasonable suspicion, as TRAs in peripheral locations such as Delft (Figure 2.3 (i)) have "become *de facto* permanent settlements awaiting government action" (Jordhus-Lier, 2015: 171). Even in successful upgrading projects, the density achieved is insufficient to allow for all residents to move back to their settlements once the upgrading intervention has been completed (UBU, 2017d). TRAs have been supplemented by the establishment of incremental development areas (IDAs), such as Wolwerivier in Melkbosstrand (Figure 2.3 (ii)), on the opposite edge of the metropolitan area from Delft. Both TRAs and IDAs are fundamentally "publicly operated informal settlements where residents stay in temporary conditions in perpetuity" (Selebalo & Rossouw, 2017: 18), without the possibility of tenure security and incremental upgrading. Furthermore, they facilitate the "Haussmannisation" of cities, enabling

local government to relocate residents on an industrial scale so as to render their cities acceptable to a "tourist visitor class" (Davis, 2006: 95). Notwithstanding this critique, large-scale, top-down upgrading interventions are politically unavoidable, even if they are based on ill-conceived, unsustainable, instrumentalist, and engineered approaches that marginalise residents and leave them frustrated and poorer (Reeler, 2005: 2).

The N2 Gateway is a prime example of such a mega-project, which is in essence little different from the forced removals during the apartheid era (Newton, 2010: n.p.). During the preparation for the 2010 FIFA World Cup, which commenced in 2004, the NDOH and the COCT decided to locate the national BNG UISP flagship pilot project (comprising 22 000 rental units) along the N2 highway between the Cape Town International Airport and the CBD (Jordhus-Lier, 2015: 169; Combrinck et al., 2017a: 48). The project illustrates the detrimental effect that tensions between different tiers of government have on development interventions, in particular w.r.t. the degree of public participation that is deemed appropriate (Jordhus-Lier & De Wet, 2013: 2; Isandla Institute, 2014b: 12). In line with BNG policy which advocates a devolution of housing delivery to local government, the COCT was the main implementation agent in the project. After initial resistance from residents of the Joe Slovo informal settlement, where the first phase of the project was to be implemented, a devastating fire in January 2005 provided an opportunity for the COCT to relocate 2 000 households to the Delft TRA under the guise of the BNG's Emergency Housing Programme. Notwithstanding the constitutional protections afforded to vulnerable groups such as informal settlement residents, the Western Cape High Court granted large-scale eviction orders that were implemented by the police, private security firms, and dog units (Combrinck et al., 2017a: 47-48).

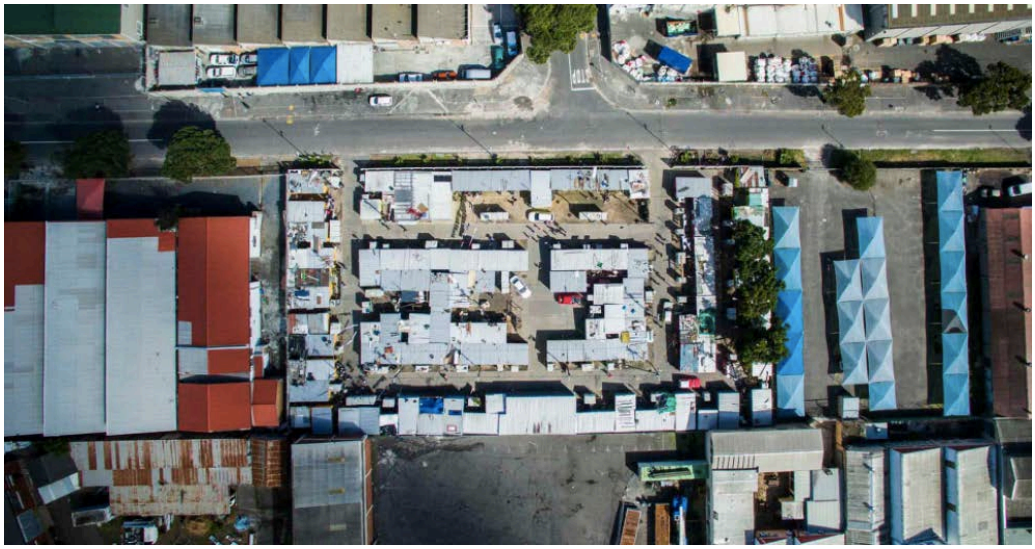

Figure 2.2 Aerial view of Flamingo Crescent informal settlement after reblocking
Photographs: Miller, J. 2016. Unequal Scenes [Online]. Available: http://www.unequalscenes.com/projects [2018, February 8]

Figure 2.3 (i) Delft TRA, referred to as "Blikkiesdorp" due to the corrugated steel sheeting temporary shelters (top), and (ii) Wolwerivier IDA in Melkbosstrand (bottom) Photographs: (i) Bonvin, L. 2016. *Sounds of Blikkiesdorp* [Online]. Available: http://mrofoundation.org/laurence-bonvin-sounds-blikkiesdorp/ [2017, May 4] (ii) Hough, A. 2017, September 27. Wolwerivier, 30km outside Cape Town, in Luhanga, P. *Photo Essay: City Shelves Further Wolwerivier Development* [Online]. Available: http://www.iol.co.za/capeargus/photo-essay-city-shelves-further-wolwerivier-development-11377287 [2017, October 9]

In response to critique regarding the minimal level of participation of affected residents and the inhumane eviction strategies employed, the COCT stated that the project was about rapid delivery and that as a result, the amount of consultation and participation had to be limited (Jordhus-Lier, 2015: 170-172). However, the N2 Gateway project took more than 10 years to complete, in part due to protests by residents and legal disputes brought on their behalf. This situation illustrates the fact that "fast-track alternatives to meaningful participation" do not necessarily yield faster results in a context where the use of force and authoritarian repression should be out of the question (Jordhus-Lier & De Wet, 2013: 2). Intended as the flagship pilot project for the UISP, the N2 Gateway became a prime example of the "narrow and uninspiring implementation of BNG" (Cirolia et al., 2016: 8). It is illustrative of the pejorative view towards informal settlement upgrading, both in terms of local government attitudes towards informal spatial practice and the particular role assumed by the architectural profession in this context. Many of the designs produced by architectural professionals for this project were recognised with Merit Awards by CIFA, despite the substandard dwelling units proving to be unaffordable and virtually uninhabitable (Combrinck, 2015: 136-139; Combrinck et al., 2017a: 47-48).

Notwithstanding the lessons learnt (or that should have been learnt) from the N2 Gateway, there is increasing talk of mega-projects as a result of national government's frustration with the slow delivery of housing (Turok, 2016b: n.p.). In 2016 the NDOHS announced plans to invest ZAR 90 billion into "catalytic projects" that are intended to provide large numbers of dwelling units by centralising government efforts and extending private sector involvement. Initially announced by the Minister of Human Settlements in her 2014 budget speech, the logic behind mega-projects is reasonably clear. However, crucial details are scarce and the apparent lack of a policy framework, prior planning, and technical preparation is surprising (Turok, 2016b: n.p.). This continues the trend of flagship informal settlement eradication projects that ignore *in situ* upgrading as the appropriate model for upgrading (Huchzermeyer, 2011: 17). Urban sector organisations have expressed concerns regarding catalytic projects, taking issue in particular with the central role of the NDOHS in managing these projects, rather than allowing local stakeholders – including residents, local organisations, the private sector, and local government – to determine and implement the institutional arrangements and programmatic responses that are best suited to local conditions (GroundUp, 2016).

2.2 Upgrading perspectives and local practice

The local urban development discourse presents several perspectives on upgrading that challenge the local government practices discussed in the previous section, particularly in terms of the nature of partnerships (between local government and residents) and suitable scales of intervention. In this subsection, I discuss upgrading perspectives and local practices that are in agreement with the normative position on sustainable urbanism presented in section 1.1. In contextualising and expanding the latter, these perspectives and practices have the potential to inform local government programmes and plans aimed at transitions to sustainable urbanism.

2.2.1 Spatial justice

The concept of 'spatial justice' combines space with social justice, and draws on the work of Lefebvre (1991b [1974]:410) in emphasising that people must claim the process of spatial production as a right through their practices and experiences. Space stands central in the context of informal settlement upgrading, and spatial rights include open and fair participation in upgrading processes, access to the city (especially central locations), freedom from spatial segregation, and equal access to public services (Mohamed Abdalla Wagialla, 2014:52). In Cape Town, the goal of spatial justice is situated in a very particular historical context that has produced an ongoing legacy of material deprivation, human underdevelopment, urban poverty, and inequitable access to social infrastructure, income, basic services, human capabilities, and public goods such as education and health. This legacy is compounded by the city's rapidly expanding population, which puts even more pressure on infrastructure and services provision. The neoliberal approach that has underpinned post-apartheid urban planning throughout South Africa has failed to develop urban social capital sufficiently to address spatial injustice. Informal settlement residents still experience social isolation and exclusion, unsafe living conditions, social breakdown, and a general lack of the infrastructure that supports social development. These factors undermine their ability to escape from poverty through their own efforts, and turn informal settlements into long-term poverty traps (Jara, 2010: 63-67).

Notwithstanding strong competition for urban land and current underinvestment in informal settlements in terms of infrastructure, housing, and residents themselves, spatial justice requires that the strong demand of residents to live in these relatively accessible locations be recognised. Such recognition implies that more efficient use must be made of the land on which informal settlements are located, by improving both internal organisation and density. While resilience as a short-term goal improves the capacity of residents to cope with challenging living conditions, the longer-term goal of spatial justice is to transform informal settlements so that they contribute to significant improvements in the socio-economic circumstances and well-being of those who live within them (Turok, 2016a: 413-414). Spatial justice ought to be the

fundamental principle that determines the merit of architecture in the particular context of informal settlements in South Africa. This statement is part of a global concern with social responsibility and the role of design in enhancing the spatial experience of residents. As such, architectural practice cannot afford to remain neutral in the face of the imbalance of power relations between the formal and the informal (Low, 2015: 17). An increased awareness of the architectural profession's capacity to stimulate social transformation will also increase its attractiveness to a more diverse body of future professionals (Harber, 2013: 184-185). With this social perspective, sustainability transcends the technical aspects of building performance, and encompasses urban, cultural, and aesthetic concerns (Cooke, 2005a: 3).

2.2.2 Mediated partnerships

Sustainable development starts with the development of people themselves, and by recognising the social cognitive capital that residents employ in sustaining their livelihoods. From this perspective, the need for capacitation, empowerment, and employment far exceeds the need for a "free house" (UBU, 2012: 2). Informal settlement upgrading is not only about land and services: when residents themselves are central partners in the upgrading process – giving expression to the Shack / Slum Dwellers International (SDI) rallying cry of "nothing for us without us" – upgrading is also about realising citizenship and equality (SA SDI Alliance, 2011: 3). A shift to the social, where participation and partnership stand central, is required to foster new collaborations between local government, residents, and architectural professionals, and to challenge the apparent inability of architectural professionals to engage with the complexity of informal settlements (Low, 2016: 15-17). In order to realise the full potential of participation and fulfil the profession's socially-mandated leadership role, architectural professionals need to examine their own practices and modes of interaction critically, particularly their (in)ability to engage with both residents and local government in a constructive manner (Dewar & Louw, 2012: 55; Low, 2012: 17). Engagement with informal spatial practice requires a realignment of the relationships between all stakeholders, so as to realise the potential of co-production as a tool for delivery and empowerment (Low, 2013a: 17). As such, informal settlement upgrading is a team effort where the leadership continually shifts between different disciplines and stakeholders (Cooke, 2014: 27). Furthermore, co-production requires an acknowledgement of plurality that challenges the prevailing notion of design as being an autonomous and singular pursuit (Low, 2012: 17; Du Trevou, 2015).

Informal settlement upgrading projects that do not allow adequate participation leave little room for residents to contribute to their own development, and results in a lack of the required solidarity and capacity to engage with local government and the private sector when projects

are implemented. The organisational capacity that develops when residents form groups to coordinate actions for their mutual benefit is a crucial prerequisite for such engagements (Swilling et al., 2016: 263, 269). As such, the sustained initiatives undertaken by local organisations to improve conditions in informal settlements are based on the principles of incrementalism and partnership (Turok, 2016a: 413-414). As a new modality of participation, partnerships offer mechanisms for the reconfiguration and co-production of upgrading projects (Cirolia et al., 2016: 9). Furthermore, in the context of recurring service delivery protests and confrontational relations between local government and residents, partnerships between public and private entities, as well as between local organisations and civil society are essential in offering an alternative paradigm for the informal settlement upgrading. Such partnerships are a means to enable government to reassess its relationships with residents and to, as part of the solution, involve them in upgrading. Such a partnership-based model that includes local organisations as intermediaries enables the achievement of mutually beneficial, negotiated outcomes and also enables facilitated learning processes that inform upgrading projects (Görgens, 2016: 299; Kumar & Robyn, 2016: 212).

In such mediated partnerships, local organisations strengthen both residents' capacity to communicate with local government, and the latter's capacity to understand residents' needs. Partnerships furthermore challenge the role of intermediary local organisations that have to mobilise and organise residents while simultaneously mediating the often hostile relationship between residents and local government (Isandla Institute, 2014a: 1). Notwithstanding this, such mediated partnerships require only a combination of small and medium adjustments within existing practice in order to build stronger relationships between local government and residents. In this context, it is important to be aware that neither of these two is a homogenous entity and that each has its own hierarchies and constraints. In local government, the latter relates to a lack of coordination between departments, inadequate capacity to work with residents and their organisations, and vague boundaries between the respective roles of officials and politicians. Resident groups also have their own constraints, predominantly due to their heterogonous nature as far as political alliances, structures, and the presence of different local organisations are concerned (Newman, 2001: 11-12). Guided by input from a national working group, including CORC and VPUU, the Isandla Institute (2014a: 10) proposes a typology of seven intermediary functions (Figure 2.4). These intermediary functions relate to three areas of concern specific to the South African context:

- Providing support to resident groups in order to enhance their ability to identify and articulate their priorities and needs, and to help them to gain access to information that allows them to interact and negotiate with local government on equal terms.

- Supporting and compelling local government to embrace participation and incremental development as central principles for upgrading.

- Establishing interfaces that encourage learning, knowledge production, and significant participation, as well as enabling negotiation between stakeholders in order to achieve collectively defined solutions and strategies.

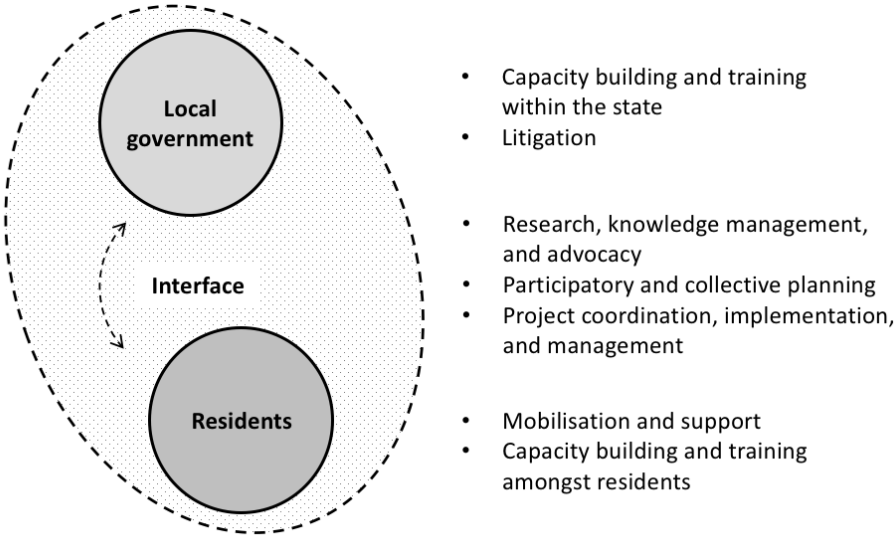

Figure 2.4 A typology of intermediary functions in mediated partnerships
Adapted from Isandla Institute (2014a: 11)

Successful intermediation requires the ability to understand, work with, and mobilise social networks to support the technical processes that constitute informal settlement upgrading. These processes entail the introduction of external funding, powerful role players, and technical skills into an existing context with its own complexities and power relations, and as such requires the navigation of competing interests, priorities, rationalities, and modes of engagement (Görgens, 2016: 280). As a result, the central challenge of *in situ* informal settlement upgrading ultimately lies in navigating the space that exists between the formal realm of local government and the self-governing structures of informal settlement residents (Combrinck et al., 2017b: 37).

2.2.3 Area-based and community-based planning

Area-based and community-based planning are niche-level examples of the pragmatic view on upgrading strategies. A variety of area-based initiatives, intended to ameliorate poverty in townships and to revitalise inner city neighbourhoods, have been introduced since 1994. There has been greater appetite for spatial targeting to tackle concentrated hardship within cities (at neighbourhood or settlement level) than for targeting such challenges at regional scale. In Cape Town, area-based policies have coincided with efforts to extend basic infrastructure and services across the entire city, and have also informed the DPP discussed at the beginning of subsection 2.1.3 (Todes & Turok, 2017:22). Area-based planning suits small, walkable settlements with a good amount of social coherence and all of the elements that residents need to sustain their economic, social, and cultural needs. At this scale, it is possible to bring together households

and various other local stakeholders to develop an explicit understanding the settlement so as to plan practical interventions that improve the functioning and quality of life in the settlement. As such, area-based planning is an important instrument in facilitating improved interaction between residents and local government (Pieterse, 2010a: 262-263). In this context, the role of local organisations expands beyond social facilitation and partnership building, and includes the technical facilitation of resident-based planning so as to complement the existing capacity within local government (Kumar & Robyn, 2016: 213). Along a similar vein, community-based planning takes the lived realities of residents as point of departure. These realities include residents' immediate needs as well as the capabilities that enable them to drive the upgrading process. The following principles underpin community-based planning (Isandla Institute, 2014c: 3-10):

- Recognition of residents' agency, capability, and creativity, and the value thereof in designing endogenous responses to local needs.
- Allowing for multivocality and recognising the inherent value of various ways of knowing, so that different rationalities can be negotiated and a dynamic development practice rooted in everyday experiences can emerge.
- Recognising the need for facilitation to mediate conflict and contestation, as the contexts in which upgrading projects are designed, implemented, and managed are complex and characterised by multiple interests, priorities, and expectations.
- Appreciating the generative potential of conflict, and redirecting energy away from tensions and towards identifying shared goals. There is a need for participatory spaces that foster communication, collaboration, and co-creation are required, and where residents can express disagreement and contest power, thereby strengthening relationships and deepening mutual understanding.
- A commitment to knowledge-sharing and empowerment, so as to enable residents to gain access to information that allows them to enter into negotiations with external stakeholders.

Area-based and community-based planning hold the potential to create spaces for participation and co-production, as well as collective agenda-setting and decision-making. This complements the intention of the UISP and results in empowered residents that transition from passive aid recipients to active decision-makers, and in adaptive, process-oriented upgrading interventions that remain contextually grounded as they unfold. Such planning also reveals the underlying complexities that sustain inequality, so that they can be addressed at local scale (Pieterse, 2010a: 262-263).

2.2.4 Reblocking and *in situ* upgrading

In contrast to projects that prioritise the construction of new housing, ultimately entailing informal settlement eradication and the relocation of residents, *in situ* upgrading is an incremental and cumulative approach that has the potential to achieve tenure security, secure basic services, and improve existing settlement layouts through the active and meaningful participation of residents (Jordhus-Lier & De Wet, 2013: 1; SA SDI Alliance & CORC, 2015: 37). As such, it is an example of the radical view on upgrading, and respects the fragile social networks and livelihood strategies of residents. In doing so *in situ* upgrading (i) contributes to residents' socio-economic well-being, (ii) reduces poverty and vulnerability, (iii) promotes human development and environmental sustainability, and (iv) bridges the gap between policy rhetoric and the reality of implementation (Ziblim, 2013: 4-6, 43). As introduced in the discussion on the COCT Proactive Reblocking Policy, reblocking is one particular type of *in situ* upgrading practice. Through reblocking, the scarce space in informal settlements is consolidated by clustering dwelling units around courtyards that promote safety by enabling passive surveillance and accommodate shared facilities such as washing lines, play spaces and food gardens. This spatial reconfiguration also allows for the installation of primary and secondary access roads and the provision of basic services such as water, sanitation, and electricity. This is done according to a spatial framework determined by residents themselves, with socio-technical assistance provided by local organisations (WPI, 2013: n.p.; Cooke, 2014: 26-27; SA SDI Alliance & CORC, 2015: 37).

Reblocking furthermore enables tenure regularisation by means of incremental transfer and creates the preconditions for further *in situ* upgrading of informal settlements without residents having to be displaced (Fieuw & Mwau, 2016: 187). As such, in the few instances where reblocking has been undertaken, it has offered local government a means to implement the UISP (Fokdal et al., 2013: 9). Local organisations support the social processes that form part of reblocking projects, such as women's saving schemes, enumeration, spatial mapping and design, and collaborative implementation of the co-designed spatial framework. Conflict resolution and mediation form a central component of such facilitation, as the respective sizes of improved dwellings have to be negotiated during the planning process (SA SDI Alliance, 2013b: 13-14).

2.3 Urban governance in Cape Town

Since the 1980s, there has been a global shift towards entrepreneurial urban governance, with local government adopting growth-oriented approaches to urban development. In South Africa – as elsewhere in the global South – such approaches have often been combined with redistributive policies towards marginalised groups. The tension between these inherently contradictory approaches (one pro-growth and the other pro-poor) is evident in the legacy of the Reconstruction and Development Programme (RDP), as the large-scale housing projects undertaken as part of this programme have failed to address the underlying causes of urban poverty in South Africa (Jacobs & Baud, 2013: 2).

2.3.1 Competitive cities paradigm

The competitive cities paradigm that emanates from entrepreneurial urban governance has also informed action plans for informal settlement eradication across the global South. In South Africa in particular, neoliberal interests inform the technocratic processes that facilitate informal settlement upgrading, and the constitutional rights of the poor residents are often compromised (Ziblim, 2013: 33-37). Since 1994, changes in the structure and governance of Cape Town – with political leadership oscillating between the ANC and Democratic Alliance (DA) – have failed to bring about the redistribution of resources promised by both parties, as the premise that the city should remain internationally competitive trumped the needs of the poor residents (Massey, 2013a: 608). Huchzermeyer (2011: 17) puts it more succinctly:

> "… the aspiration of urban competitiveness, intensified by the hosting of the 2010 FIFA World Cup, shaped an obsession with redeveloping and not upgrading those settlements visible to tourists and investors."

The amount of new policy that has been developed since 1994 has rendered implementation thereof simply impossible, with local government officials having "no idea how to navigate their way through the morass of new, and ever-changing, policy imperatives" (Pieterse, 2009: 11). In Cape Town, attempts at implementing more innovative governance systems have been compromised by deep political rifts within local government, coupled with substantial institutional disjunctures between the political and administrative domains. Pieterse (2006: 400) makes two observations in this regard:

- Most local government entities are poorly structured and lack sufficient human capital, rendering them unable to engage effectively with multi-dimensional policy frameworks.
- During implementation at local government level, the underpinnings of holistic policy models are often ignored or erased, and policy intentions quickly become instrumentalist rationalities fixated on short-term gains.

The result of such dynamics is that – despite having policies that encourage spatial justice, urban restructuring, and social development – local governments have been unable to address the spatial legacy of apartheid through effective policy implementation (Uğur, 2014: 112). This situation is exacerbated by the dominant role of government in shaping the trajectory of low-cost housing delivery, as well as by the mechanistic nature of the relationship between local government, the private sector, and the built environment professions. In its attempt to implement policy and achieve sustainable human settlements, local government – already constrained by a weak skills base and a culture of bureaucratic compliance – relies predominantly on technical processes facilitated by the private sector. This results in the involvement of informal settlement residents being reduced to "consultative" participation through formal structures (Görgens, 2016: 249). Such implementation is in direct contrast to the United Nations Development Programme (UNDP) recommendation that good governance should be participatory, transparent, and accountable (Ziblim, 2013: 9).

2.3.2 Conclusion

The lack of political will to implement policy that fosters capacity building amongst residents is also a result of the political hegemony of the ANC, which is intolerant of the potential threat that local organisations of the urban poor pose to their increasingly corrupt government (Combrinck et al., 2017a: 46). Notwithstanding – or perhaps as a result of – this lack of political will, the urban governance discourse has seen a shift away from local government as the dominant locus of power in contemporary society, to more hybrid governance arrangements that allow for the participation of various actors (Jacobs & Baud, 2013: 1). In Cape Town this can be seen in the innovative upgrading practices that emanate from local organisations, as well as in more collaborative relationships between local government and local organisations[2]. In the following chapter, the impact of such practices and relationships on conventional architectural practice will be explored.

[2] Reblocking is an example of such innovative practice, and is discussed in subsection 2.1.3. The COCT is also engaging more frequently with local organisations to act as implementing agent for upgrading interventions (Kohler, 2016).

Chapter 3

Architectural practice in Cape Town

Exploring the regime level and the niche level

Chapter 3 Architectural practice in Cape Town
Exploring the regime level and the niche level

This chapter addresses two aims of the research presented in this dissertation. The first aim is to explore the regime level, which is done by means of a critical appraisal of architectural practice in South Africa. A second research aim, to explore the niche level, is furthermore addressed by introducing GAP as a perspective from which to approach an emergent mode of architectural practice in the context of Cape Town.

3.1 Local architectural practice: A critical appraisal

The exploration of the regime level of the MLP will continue in this section, with the focus shifting from informal settlement upgrading to local architectural practice. Despite the profession's limited engagement with informal settlement upgrading, the local discourse on architectural practice does reflect a concern (albeit predominantly under researchers) with the role that architectural professions ought to be playing in such endeavours[1].

3.1.1 Structure of the profession

Two organisations shape architectural practice in South Africa. The first is a statutory body – the South African Council for the Architectural Profession (SACAP) – and the second is a voluntary association, the South African Institute of Architects (SAIA). SAIA is comprised of a number of regional institutes, with the Cape Institute for Architecture (CIFA) representing the organisation in Cape Town (Figure 3.1). In relation to issues pertaining to urban development, these organisations are complemented by the Urban Design Institute of South Africa (UDISA), and on a larger scale, the Association of African Planning Schools (AAPS). The principal objective of the latter is to ensure that future professionals are suitably equipped to respond effectively and meaningfully to African urbanisation, particularly w.r.t. informal spatial practice and collaborative practice (Watson & Agbola, 2013: 6-7).

[1] A substantial part of this discourse is facilitated by the publications of SAIA: their bi-monthly journal *ArchSA* and their annual *Digest of South African Architecture*.

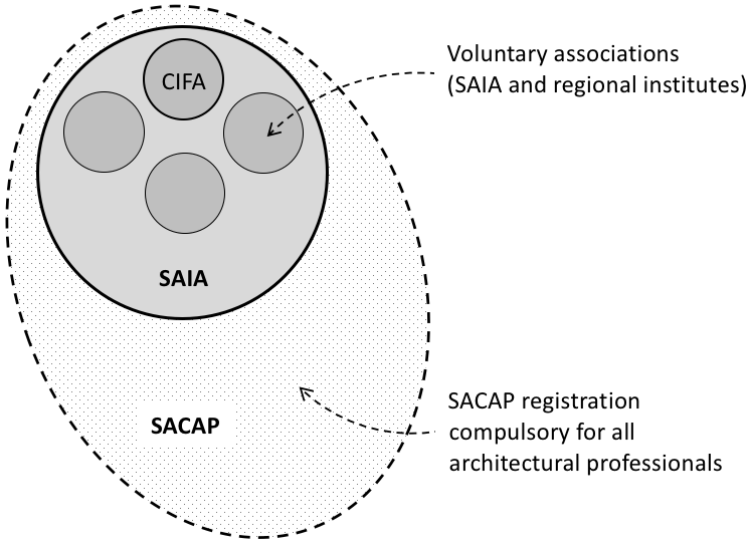

Figure 3.1 The relationship between SACAP, SAIA, and the regional institutes
Diagram by author

3.1.1.1 South African Council for the Architectural Profession

The Architectural Profession Act was promulgated in 2000, and SACAP was established soon thereafter. This prompted substantial changes to the structure of the profession: whereas previous legislation allowed only for the professional registration of architects, SACAP now has four registration categories, i.e. architectural draughtsperson, architectural technologist, senior architectural technologist, and architect. In broadening access to the profession in this manner, SACAP aims to promote people-centred architecture. Their intent is to do so by transforming, promoting, and regulating the architectural profession by means of collaborative engagement (Harber, 2013: 183; SACAP, 2014). Architectural professionals that are registered with SACAP are legally permitted to render basic (individualised) design and construction services related to buildings. In addition, they are also allowed to undertake town planning, urban design, master planning, and landscape design services, resulting in an overlap – potentially either synergistic or counterproductive – with the work of other built environment professionals (Combrinck & Bennett, 2016: 309). The competencies that are required for professional registration are indicated in Table 3.1, and can be attained through formal, academic learning or by means of work-integrated learning in practice.

Table 3.1 Competencies required for registration with SACAP as a candidate professional architect. Adapted from SACAP (2010)

Category	Competencies
1. **Architectural design**	a. Ability to create a competent building design of a complex nature, based on parameters and constraints developed through independent scientific research, and sensitive to issues of culture, environment ,and sustainability. Such a design is to be created in a responsible, appropriate, and economical manner in an urban, suburban, or rural context. b. Ability to appraise and define a complex architectural problem. c. Ability to prepare an appropriate concept. d. Ability to develop the design to an ultimate and rational conclusion. e. Ability to present the design synthesis in a logical manner.
2. **Environmental relationships**	a. Understanding of relationship between the natural and built environment. b. Ability to evaluate landscapes and environmental structures in basic terms in an analytical, constructive, and critical manner. c. Understanding of the basic spatial, functional, and aesthetic aspects of landscape architecture.
3. **Construction technology**	a. Ability to implement innovative applications of construction methods and uses for materials related to multi-storey, multi-functional, complex building types. b. Ability to recognise the demands of context, as well as local resources and appropriate technologies that harmonise with the environment, to the extent that these influence the construction of a building. c. Ability to develop durable, cost-effective, and responsive construction details. d. Ability to conduct advanced research into construction methods and materials, and their appropriate applications.
4. **Building structures**	a. Understanding of structural concepts pertaining to buildings. b. Ability to integrate structure and building design. c. Understanding of calculations regarding the structural aspects of buildings.
5. **Contextual and urban relationships**	a. Understanding of the basic spatial, functional, and aesthetic aspects relating to urban design. b. Ability to evaluate urban environments in very basic terms in an analytical, constructive, and critical manner. c. Understanding of and sensitivity to urban aspects when designing individual buildings.
6. **Architectural history, theory, and precedent**	a. Understanding of architectural history and theory as part of a wider natural, social, technological, and cultural system. b. Ability to evaluate and analyse the built form critically in complex terms. c. Understanding of the principles of learning from historical precedent. d. Understanding of the social, ethical, spatial, and aesthetic aspects of the environment. e. Ability to conduct relevant research into architectural theories.

Category	Competencies
7. **Building services and related technologies**	a. Ability to integrate the various technological aspects relating to services in one cohesive design and find technological solutions. b. Understanding of the building regulations pertaining to all building services. c. Understanding of the following technological aspects and building services: drainage and water reticulation, electrical and electronic services and lighting, communications, air and gas supply, heating and cooling, elevators and escalators, fire protection and control, and acoustics and sound systems.
8. **Contract documentation and administration**	a. Ability to produce a comprehensive set of contract documents for a complex building to acceptable practice standards. b. Ability to develop durable, cost-effective, climate-responsive construction systems and details. c. Ability to recognise the demands of context and local resources, and appropriate technologies that harmonise with the environment. d. Understanding of issues of sustainability of the built environment and ability to evaluate materials in an ethical and socially responsible manner. e. Ability to do component and material specification. f. Ability to implement the National Building Regulations (NBR) as well as the requirements of the National Home Builders Registration Council (NHBRC). g. Ability to respond to local authority approval requirements and procedures.
9. **Computer applications**	a. Understanding of the range of computer technology presently in use in architectural practice. b. Ability to apply a range of computer technology presently in use in architectural practice in the execution of work, with computer software including web browsers and communication programs, word processing, spreadsheets, databases, architectural drawing and three dimensional modelling programs, and graphic and image editing programs.
10. **Office practice, legal aspects, and ethics**	a. Ability to comply with all the regulatory and legal aspects of the profession. b. Ability to implement the contents of the various building contracts and the SAIA practice manual. c. Ability to apply the basic concepts of business structures and principles pertaining to the architectural profession. d. Ability to design a feasible information access and retrieval system. e. Ability to design a functional and integrated management system. f. Ability to implement administrative and logistical support systems in a practice. g. Ability to design a marketing strategy. h. Ability to participate meaningfully in the management and administration of a building project. i. Ability to set up and run a building project successfully.

This combination of essential skills and knowledge is organised into ten categories: architectural design; environmental relationships; construction technology; building structures; contextual and urban relationships; architectural history, theory, and precedent; building services and related technologies; contract documentation and administration; computer applications; and office practice, legal aspects, and ethics (SACAP, 2010: 2). Notwithstanding the wide scope of work entailed by these competencies, there has been no effort on the part of SACAP to institutionalise the potential contribution that the profession can make towards human settlement projects. Likewise, housing policy also pays scant attention to the role that architectural professionals could play in achieving more sustainable human settlements. As a result, the work of architectural professionals that do engage in this endeavour remains marginal, failing to achieve the critical mass required to develop beyond a niche-level innovation (Combrinck & Bennett, 2016: 307). This points to a failure on the part of SACAP to fulfil its mandate to democratise the architectural profession, as the profession remains entrenched within the formal system, and upholds that system by virtue of the profession's legal acknowledgement. As such, professional engagements with residents are confronted by a fundamental contradiction: having to engage with informal spatial practice from within the formal confines of conventional architectural practice (Combrinck, Vosloo & Osman, 2017b: 38).

3.1.1.2 South African Institute of Architects

SAIA is a voluntary association of affiliated and regional institutes, including CIFA, and is affiliated with the International Union of Architects (IUA). SAIA aims to promote excellence in architecture and to contribute to the enhancement of society and the environment. To this end, members are required to strive to protect and ensure the welfare of all members of society, as well as to enhance the natural environment to the benefit of all through the application of their professional skills. In their capacity as architectural professionals, members of SAIA are required to provide leadership, critical judgment, specialist knowledge, skills, and aptitude for the design and development of the built environment (SAIA, 2017). In the information that they provide to clients intending to work with an architectural professional, CIFA draws attention to the length and the nature of the engagement between architectural professional and client, which they define as a collaborative process that unfolds over "a couple of years at least for a residential project, and even longer for a commercial building" (CIFA, 2017). The SAIA Client-Architect Agreement allows for a standard service and a number of partial services, all of which are premised on a combination of fixed stages: (i) inception, (ii) concept and viability, (iii) design development, (iv) documentation and procurement, (v) construction, and (vi) close out. This agreement further describes the obligations of the parties towards each other, as well as the conditions of service (SAIA, 2008: 1-2).

SAIA and its regional institutes are fundamentally conservative in their protection of their own interest by promoting the limited expertise of the architectural profession. Low (2014: 18-19), a longstanding member of the editorial panel of the *Digest of South African Architecture* (itself a SAIA-endorsed publication), urges SAIA to "embrace plurality in seeking to construct new

identities in working toward the critical difference necessary to build and sustain any civil society". In his view, this implies contesting the formal conventions of architectural practice, thereby contributing to the strategic development and broadening of the profession. This is already evident in the emergence of a number of new disciplinary forms, including heritage and environmental practitioners, as a response to evolving built environment regulations. The research presented in this dissertation seeks to explore a similar broadening – or rather, grounding – of architectural practice through engagements with residents, their informal spatial practice, and *in situ* upgrading as a transition to sustainable urbanism.

3.1.2 Beyond public projects

The transition to democracy in 1994 has stimulated the development of a substantial number of projects commissioned by provincial Departments of Public Works. These public projects have made a significant contribution to the role that the architectural profession has played in South Africa during the past two decades. Initially such projects entailed the provision of infrastructure in underserved townships: new railway stations, public bathhouses, libraries, and healthcare facilities (Van Wyk, 1999: 5; De Jager, Du Toit, Hugo Hamman, Low & Van Wyk, 2003: 9). As such, these projects held significant potential for spatial transformation, but were delivered in a top-down manner with limited participation by residents themselves.[2] Notwithstanding this critique, publicly commissioned projects have enriched the architectural discourse with "different and unfamiliar" projects (Low et al., 2005: 14). Through public projects, architecture was employed as a tool for nation building, and architectural professionals were afforded the opportunity to "become agents in the re-imagining and representation of history" (Bremner, 2007: 85). There is also a marked increase in the variety of architectural typologies, which reflects a tentative engagement with informal spatial practice: neighbourhood centres, informal traders' markets, and multi-modal transport interchanges that accommodate both buses and minibus taxis[3] (De Raedt, 2012: 8-9). Such opportunities have provided the architectural profession with an opportunity to re-imagine itself, and pose new questions about its broader responsibility towards society (Bremner, 2005: 98).

According to one view, the primary role of the architectural profession is to present new and better possibilities for the urban environment, continually seeking to advance the public interest, particularly in the context of informal settlements, and to lead the public debate about suitable approaches for achieving transitions to sustainable urbanism (Dewar & Louw, 2012: 55). However,

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2 My own experience as candidate architect working on the design of the Selosesha Public Library in Thaba Nchu for the Free State Department of Public Works during 2003-2004 attests to this. While a series of presentations were made to officials at local and provincial government, no consultations or presentations included residents (or even the local librarian).

3 Besides walking, minibus taxis are the most prevalent form of transport in Cape Town, with more than 7 500 registered taxis operating in the city during 2016 (WhereIsMyTransport, 2017).

in terms of urban integration, inclusion, and the creation of sustainable human settlements, the impact of the architectural profession has been marginal (Cooke, 2011a: 1; Combrinck, 2015). Conventional architectural practice has proven inadequate to address South Africa's developmental needs, most notably as a result of the extremely limited reach of current modes of practice as far as informal settlements are concerned (Bennett & Osman, 2013: n.p.). Architectural practice has failed to realise the "radically democratic secular society promised by struggle and the post-apartheid condition" (Low, 2006: 9-10), despite the privileged position that the profession has to engage with the reconfiguration of urban space. However, the past decade has seen a consistent and marked decline in the number of public projects being commissioned by local and provincial government (Low, 2007: 13; 2013a: 15).

Coinciding with this decline has been an increase in the number of community-based projects that represent an alternative mode of architectural practice (Low, 2008: 13). Accordingly, making constructive use of the profession's privileged position requires an engagement with processes that are characterised by plurality and difference, so as to detach architectural practice from the economic cycles of capitalist production and instead embrace a critical professionalism that extends beyond the confines of commercialism (Low, 2009: 13; Low, 2014: 17). Similar arguments were presented at the IUA conference held in Durban, South Africa, during 2014. The conference had a diverse programme that aimed to re-assess professional values and ethics. New professional guidelines for built environment interventions, as well as new systems, methods, and technologies to achieve relevance and maximum impact were suggested. Calls were also made for alternative modes of engagement and decision-making, drawing on solutions, new approaches, and sustainable practice that already exists on the margins of professional practice. In closing, the conference proposed the establishment of guidelines for community-based architecture in South Africa (Osman, 2014). These could potentially inform the provision of housing in a way that contributes to skills development, fosters emerging building contractors, and provides ongoing employment (Cooke, 2009: 1). Furthermore, these guidelines should foster an appreciation of both ecological limits and collective (as well as individual) human needs, thereby enabling an engagement with the social dimensions of architecture so as to anchor architectural practice in local conditions while remaining cognisant of global concerns (Dewar & Louw, 2012: 55; Lepik, 2013: 18). An important component of such practice is to develop the necessary flexibility and adaptability (particularly w.r.t. housing standards) in order to assist residents in realising the potential of their settlements to become dynamic and enabling urban environments (Cooke, 2013a: 1).

3.1.3 Establishing a new tradition

Engaging with the social dimensions of architecture will enable architectural professionals to act as agents of change and to contribute to spatial redress through informal settlement upgrading (Combrinck et al., 2017b: 38). Doing so will require close collaboration with residents themselves, with architectural professionals facilitating the process as it unfolds to ensure that residents are empowered to give expression to their own identity (Lepik, 2013: 14; Combrinck & Bennett, 2016: 310). However, some local organisations (such as ISN) resist professional involvement in resident-driven upgrading processes due to past experiences of professional heavy-handedness and the imposition of inappropriate top-down proposals, borne of a lack of professional humility and the tendency to "default into design" (Combrinck & Bennett, 2016: 309). Notwithstanding these challenges, considered and reflective architectural practice is a critical site for the production of local disciplinary knowledge that may inform a new tradition of architectural practice (Low, 2010: 13; Low, 2014: 19). Such practice further provides an opportunity to recalibrate the architectural profession's perception of and engagement with informal spatial practice, and to appreciate it as a phenomenon informed by the local traditions and cultural practices that apartheid modernism sought to marginalise and obliterate (Low, 2007: 13).

As such, the contextual realities encountered in informal settlements are much closer to those that informed pre-modernist settlement making, and it is incumbent upon architectural professionals to pay more attention to local social requirements and traditions (Todeschini, 2008: 14; Lepik, 2013: 11). Doing so does not necessarily entail a reclaiming of the past, but rather "provokes new imaginaries that might [re-]locate modernity within an older tradition; one that foregrounds the social over the materiality of the purely spatial" (Low, 2015: 15). However, by its very nature the architectural profession is implicated in processes that support and perpetuate the hegemony of the formal. At the same time, the profession is unable to challenge this power balance due to its exclusion from government structures as well as its own internal limitations. The latter include (i) its elitist position, (ii) having no culture of pro bono work, (iii) insufficient engagement with political aspects at an educational level, and most importantly, (iv) the fundamentally individualist nature of architectural engagement, which renders it incapable of engaging in collective power struggles to achieve informal settlement upgrading (Combrinck et al., 2017a: 45).

In order to address this situation, architectural practice requires a strong set of values, centred on responsible resource use and people-centred buildings and spaces (Cooke, 2010: 3). These values should support a compact, urban model of development that is informed by both humanism and environmentalism, and considers the larger public as its client (Dewar, 2004: 27). The challenge, then, is to develop a mode of architectural practice that reflects such a particular set of values (Du Toit, Hugo Hamman, Low & Sandler, 2004: 6). To this end, Dewar (2004: 29) offers some suggestions:

- Recognise that current practices are inadequate and have resulted in architectural professionals becoming marginalised in the creation of human settlements.
- Reaffirm a belief in the fundamental importance of spatial design and accept the challenge to act as agents of social change.
- Accept that the profession needs a normative base that reflects our contemporary values, based on promoting equity, integration, sustainability, dignity, and justice.
- Do not rely on charters or proclamations to effect change, but instead recognise that all architectural professionals have a role to play in the struggle to achieve sustainable urbanism.
- Meaningful change is incremental, and rather than a wholesale rejection of the past, it requires continual reinterpretation of precedent so as to retain and enhance that which works while changing that which does not.
- Recognise design problems as parts of a broader whole, and that the responsibility of any architectural intervention is to improve the quality of the whole.

In order to implement these values in a new mode of practice, architectural professionals must take up the role as partner of both local government and the private sector, and provide leadership within the profession based on a shared ethical position. To do so, the conflicting and competitive action of individuals must be replaced with powerful collective action that is rooted in introspection about the aims and values of the architectural profession in our particular cultural and historical context (Cooke, 2012: 1). Such contributions, which "critically question the role of architecture as a catalyst in the transformation of everyday reality from an explicitly architectural point of view", are very scarce (De Raedt, 2012: 10). However, at a number of schools of architecture in South Africa[4], the active engagement of researchers with residents so as to support grass-roots upgrading initiatives (rather than government-driven projects) is slowly beginning to establish a platform for the emergence of such practice (De Klerk, 2016: 52).

[4] The Universities of Cape Town (UCT), Pretoria (UP), and Johannesburg (UJ), working in Imizamo Yethu (Hout Bay), Slovo Park (Soweto), and Marlboro South (Alexandria) respectively, as well as my own work together with Hermie Delport at CPUT in Gugulethu, Nyanga, and Philippi.

3.2 An emergent mode of practice

This section continues the discussion of architectural practice in Cape Town with an exploration of the niche level, so as to address the second aim of the research presented in this dissertation. As discussed, local schools of architecture have begun to recognise the role that the profession has to play in engaging with informal spatial practice so as to support transitions to sustainable urbanism (Harber, 2013: 183). Alternative approaches to architectural practice that enable the provision of spatial, technical, and social expertise to residents in support of upgrading interventions have not yet been entrenched, and remain niche-level innovations outside of the conventional architectural practice regime (Osman, 2015). Nevertheless, live projects are an effective vehicle to experiment with new modes of practice, particularly co-production and collaborative design together with residents (Low, 2015: 15). Live projects emanate from a questioning of traditional methods of architectural education, and provide a transdisciplinary space where meaningful frameworks to contextualise and frame disparate knowledges can be constructed so as to foster learning. Architectural practice requires a similar evolution, one that combines technical and theoretical skills with a deeper appreciation of and openness towards different ways of seeing and responding to complex urban problems (Combrinck, 2015: 2; De Klerk, 2016: 51). In their engagements with residents, architectural professionals are afforded the opportunity to derive lessons relating to the intricate involvement of users and stakeholders during *in situ* upgrading interventions. At present, such engagements in Cape Town occur predominantly through live projects that draw on longer-term collaborations between universities, local organisations, and informal settlement residents (Bennett & Osman, 2013: n.p.).

3.2.1 Co-production

For the most part, architectural professionals are closely aligned with the neoliberal production of the built environment, and those that are able to operate as both activists and entrepreneurs constitute a very small portion of the profession (De Klerk, 2016: 52). However, this has begun to change, in particular through the combined action of architectural professionals who work either collaboratively or in strategic partnership with local organisations. Such a mode of practice entails a re-examination of the role of the "visiting professional outsider", and understands architectural activities such as planning and design as part of a means of enablement that leads to the involvement of residents in a process of co-production (Ward, 2004: xii). Co-production deviates from conventional upgrading strategies that focus on obtaining tenure security and service infrastructure provision, and instead encompasses coproduced, incremental upgrading interventions (Swilling et al., 2016: 263). For architectural professionals, involvement in the co-production of informal settlement upgrading interventions is a move away from working in isolation from future users (Osman & Bennett, 2014: 1443). As such, co-production fosters social innovation in two ways: by involving non-conventional grassroots actors and groups, and by improving the built environment in order to better satisfy the needs of residents (Oosterlynck,

Albrechts & Van den Broeck, 2011: 3-5). Where professional knowledge reaffirms or merely shifts existing conditions incrementally, the knowledge unlocked in engagements with residents "contains the germs of new spatial possibilities" (Till, 2005: 37). Co-production leads to a mutually empowering mode of architectural practice, one that is sensitive to and aware of

> "… the political aspects of space, the vagaries of the lives of users, different modes of communication and representation, of an expanded definition of architectural knowledge, and of the inescapable contingency of practice." (Till, 2005: 41)

The process of co-production enables a meeting of the informal and the formal, and holds the potential to facilitate constructive alternative approaches (involving both local government and residents) so as to improve upgrading practice (SA SDI Alliance, 2013b: 100). Furthermore, co-production requires of architectural professionals to manage the interface between the different stakeholders in upgrading interventions, thereby ensuring mutually beneficial outcomes. This entails taking up an intermediary role: one that bolsters the capacity of residents to communicate with local government officials, and simultaneously strengthens officials' capacity to understand the needs and aspirations of residents (Isandla Institute, 2014a: 1). Co-production also offers insight into the manner in which residents develop the knowledge capacity required to generate their own solutions. Their point of departure is not poverty – the absence of something – but rather meaningful engagements that lead to coproduced problem statements (Swilling et al., 2016: 275). Swilling et al. (2016: 269) also draw attention to the fact that the knowledge capabilities of local organisations must be reinforced in order for co-production to transcend being a mere route to securing the delivery of services. Such reinforcement will enable informal settlement residents to consolidate their organisational base and build their capacity to negotiate with local government. In this regard, co-production depends on the willingness of both researchers and practitioners to "coproduce socially useful knowledge with the most marginalised and poorest sectors of society" (Swilling et al., 2016: 270). Successful co-production thus entails the continuous involvement of those whose daily lives are impacted by development interventions. Organisations such as ISN utilise co-production as a grassroots political strategy through which residents secure both political influence and access to resources. The task of architectural professionals in this endeavour is to be embed themselves in such processes and to facilitate their continued progress (Ward, 2004: xiii; Isandla Institute, 2014a: 2; Fieuw & Mwau, 2016: 186). This is as opposed to simply

> "… building lots of houses for people and in places one does not know, where money is scarce and statistical information is unreliable, [seeing as that] is neither an efficient nor an equitable way of solving housing problems, nor is it good design practice" (Hamdi, 1991: xi).

In his later writing, Hamdi (2004: 116) describes such practice as "a kind of professional artistry which enables us to improvise and be informed" and to work "somewhere between order and chaos". It allows human capital to take precedence over formal design, and the successful

implementation of such practice requires a much more sustained professional involvement than what is the norm at present (Low, 2013b: 155). Projects that emanate from collaborations with local organisations are characterised by local participation and lower budgets. Both of these are aspects that impact directly on the design process and often foster significant architectural innovation in its response to the diversity embedded in informal spatial practice (Low, 2009: 11; Bader, 2013: 131). Thus, employing co-production as a mode of architectural practice requires a fundamental belief in the genius of urbanity, and the ability to engage with residents in a deep and respectful manner so as to comprehend their needs and concerns (Kotze, 2017: 2).

3.2.2 Collaborative design

Despite the challenging nature of doing so, redirecting architectural practice towards informal spatial practice by engaging in co-production holds the potential to unlock the latent energy and social capital of residents in promoting transitions to sustainable urbanism at settlement scale (Simone, 2004b: 409). Through live projects, residents have been shown to derive benefit from their engagements with young architectural professionals by employing creative visual methods to document existing conditions and issues, thereby developing a shared understanding of the existing situation. Such documentation enables residents to negotiate with local government regarding their development needs and aspirations, and informs collaborative design processes based on shared authorship and ownership, where participation and design are merged into one process (Combrinck & Bennett, 2016: 319). Architectural professionals are embedded in the spatial context when engaging in collaborative design, and it is often a difficult, flawed, and interrupted process that yields only partial successes. However, engaging with residents in collaboration with a local organisation enables a focus on the design process as a form of socio-technical facilitation and constrains architectural professionals' inclination to address every problem with a design response (Combrinck, 2015: 216-217). Such collaboration enables user-centred and transdisciplinary engagements with informal settlement upgrading that focus on collective urban space rather than individual households (Combrinck, 2015: 219; De Klerk, 2016: 52). By preventing architectural professionals from "defaulting into design", collaborative design enables them to spend "much more time around the beginning", in collaboration with other disciplines, so as to ensure adequate engagement with the larger issues at stake (Combrinck, 2015: 218-219). This entails an accretive rather than concept-driven design process that allows for experimentation and the exploration of alternatives so as to identify unifying patterns in the complexity of informal spatial practice (Cooke, 2013b: 1). Collaborative design processes are not dissimilar from designing a building, as both "require thresholds and edges, public and collegial spaces, places of retreat and of one-on-one dialogue, spaces to play in, [and] spaces of formality and ritual" (Cowen, 2013: 24). It is through such collaborative and continuous practices – aimed at purposefully changing the world – that architectural professionals get to know themselves, thereby "overcoming and transcending [their] own limitations" (Stetsenko, 2008: 483).

3.2.3 Evolving professional knowledge

For architectural professionals, addressing their own limitations involves a relinquishment of power and a recognition of the limits of professional knowledge (Till, 2005: 31). Doing so enables them to "step outside of the classically delineated [professional] roles" (Lofvers & Devos, 2015: 4) and engage in activities that foster learning on the boundaries of practice. In order to do so, one must balance drawing on a profession's body of knowledge with the act of breaking free from it, so as to explore and interact with perspectives from beyond the boundary of practice (Wenger, 2012: 3) As indicated in Figure 3.2, this includes taking up alternative roles on very local scales, and employing a range of different skills, attitudes, and roles to interact with residents and local organisations. Such interaction informs a more profound understanding of the emergent modes of practice that are "consciously developing in response to the increasing importance of self-organisation, and bottom-up involvement in spatial planning" (Lofvers & Devos, 2015: 3-4). Furthermore, it entails a critical interrogation of architectural practice in an "ongoing, reflective, collaborative, inclusive, learning-oriented, growth-promoting way" (Stoll, Bolam, McMahon, Wallace & Thomas, 2006: 223). As such, a profession's body of knowledge is more than a predetermined set of competencies such as those described by SACAP, and instead includes a dynamic and ever-changing landscape of practices that (over and above professional practice) involves research, teaching, management, regulation, professional associations, and contexts where beneficiaries of such practice develop their own views (Wenger, 2012: 4). Architectural practice must be "modest and light-footed enough" to adapt to continually changing circumstances (Till, 2009: 59). Working in this manner requires a shift of attention from the

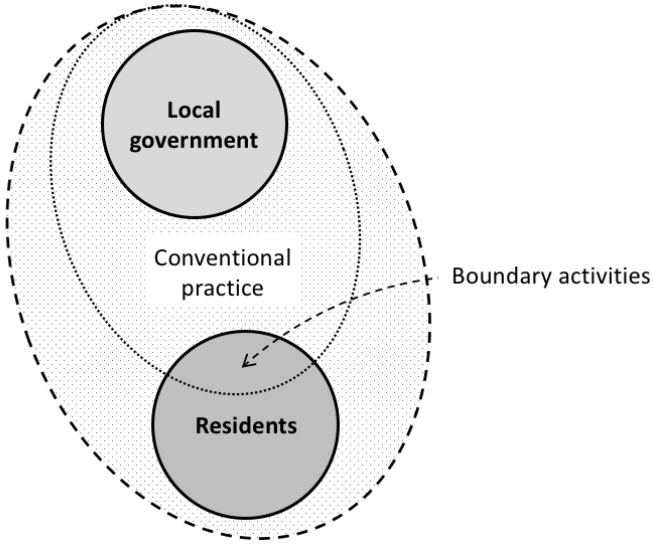

Figure 3.2 Expanding conventional architectural practice by engaging with residents
Diagram by author, based on Wenger (2012: 3)

production of built artefacts to the realisation of agency, by exercising architectural intelligence rather than merely applying architectural knowledge. Architectural intelligence draws on a vast range of intellectual activity, from the philosophical to the very practical. When freed from the urge to create stability and certainty, architectural intelligence enables architectural professionals to develop the flexible thinking that is required to address the contingency inherent in architectural practice (Till, 2009: 164-168). In the context of informal settlement upgrading, the contingency that architectural practice is exposed to must not be viewed as a source of dashed hopes, but rather as a source of opportunity and emancipation (Bauman, 1991: 234). This requires a mode of architectural practice that is flexible and adaptive, and that works from within the context that it engages with rather than observing it from the outside (Till, 2009: 194).

3.2.4 Capacities for 'subversive praxis'

As discussed in the problem statement presented in the first chapter, the challenge inherent in working from within the context of engagement is achieving a balance between "the straightjackets of professional norms and codes" and "getting lost in the rabbit hole of transgressive insurgency" (Pieterse, 2005: 53). However, when challenged in this manner, architectural professionals are presented with the opportunity "to invent new roles for themselves and develop new methods of practice as they navigate relatively uncharted terrain" (Osman & Bennett, 2014: 1442). Pieterse proposes four capacities to assist architectural professionals in developing an appropriate way of "being and moving in complexity" so as to realise human flourishing – both their own and that of the people they serve through their professional engagement. These capacities for 'subversive praxis' are described as follows (Pieterse, 2004: 350-352):

- Code-switching between multiple registers of knowledge (both formal and informal). This entails a recognition of the power dynamics embedded in different knowledges and of their interrelations, as well as developing a sensitivity towards reading and interpreting the "complex social registers … that constitute the everyday". In practical terms, this requires architectural professionals' presence in informal settlement contexts, and the spending of time and effort to experience the social context.

- Adopting a multi-focal perspective on architectural practice as a "deeply political act", as any intervention will result in a shift in power relations – either reinforcing existing ones, or challenging and transforming them to benefit those who "are systematically disempowered and marginalised". It is critical to "expect and to understand unusual trajectories and linkages that bind together the multiple identities and affiliations that co-exist in any neighbourhood".

- Self-reflexivity, i.e. the ability to "recognise oneself and one's own (projected) desires in a development process". When engaging in informal settlement upgrading interventions against the background of South Africa's "history of arbitrary cruelty and terror", we cede "bits and pieces of ourselves", and "because of these deeply inscribed psychological distresses we have to take care in who we seek to become in our work for others".

- Being empirically informed and symbolically attuned, by getting as close as possible to what is, in empirical terms, going on in a specific context, and contextualising this knowledge in larger scale analyses. This requires maintaining a balance between "ideological polemic or technocratic preaching" on the one hand, and empirical patterns or trends on the other, while developing an understanding of the "symbolic, imaginary, and phenomenological dimensions" of the context.

These capacities represent an open-ended extension of the prescribed competencies that delineate (and limit) conventional architectural practice (described in Table 3.1 in the previous section). In order to sustain GAP as an emergent mode of architectural practice, a transformation is required that impacts on both thinking and practice; on education, content, and methods; as well as on regulatory and voluntary organisations such as SACAP and SAIA (Osman, 2015). This transformation must be led by the profession itself, and be informed by a critical reflection on its own practices and interactions – within and between disciplines, as well as with residents – rather than being imposed by means of policy or legislation (Dewar & Louw, 2012: 60). In this context, capacity is understood as the "emergent combination of individual competencies and collective capabilities that enables a human system to create value" (Baser & Morgan, 2008: 34). Accordingly, capacity building pertains to the development of both individual competencies and collective capabilities (Devisch & Huybrechts, 2016: 177). For the architectural profession, capacity building needs to relate to its tangible aspects (the organisational structure of the profession) as well as its intangible aspects: the altering of mindsets, behavioural patterns, degrees of legitimacy, and its relationship with informal spatial practice. While new resources, ideas, connections, and opportunities may be provided, capacity building relies on voluntary collective action, as the energy, motivation, and commitment of individual actors cannot be mandated (Baser & Morgan, 2008: 123). As such, sustained engagement with the less familiar terrain of the informal is required to foster alternative modes of architectural practice that are able to reinvent and transform the regime of conventional architectural practice (Low, 2011: 13-15).

3.2.5 Conclusion

The research presented in this dissertation represents my own contribution to this sustained engagement aimed at fostering GAP as an emergent mode of practice. My contention is that in order for informal settlement upgrading to constitute a just transition to sustainable urbanism, it must be informed by area-based and community-based planning, and engaged with through mediated partnerships between local government and residents so as to promote spatial justice. For the architectural profession, promoting spatial justice requires the establishment of a new tradition that foregrounds the social dimensions of architecture by engaging in co-production and collaborative design with residents, thereby expanding the scope of conventional architectural practice and developing the knowledge and capacities required for GAP. In the next chapter, I introduce a theoretical perspective to inform such a new tradition and position GAP as an intermediate conceptual tool within the analytical framework provided by DWR.

Chapter 4

Theoretical and analytical framework

Grounded architectural practice in transitions to sustainable urbanism

Chapter 4 Theoretical and analytical framework
Grounded architectural practice in transitions to sustainable urbanism

Whereas the previous two chapters addressed the first two aims of the research by providing a contextual perspective on transitions to sustainable urbanism, as well as exploring the regime level and niche level of architectural practice in Cape Town, this chapter will address the same aims by developing a theoretical and analytical framework. This framework will advance the two ideas proposed in the problem statement and rationale (section 1.2), both of which guide and structure the research. The first of these ideas – the notion of 'in[formal]ity' – is perceived as a spatial practice in a continued exploration of the regime level (following on from section 3.1). Then, furthering the exploration of the niche level that commenced in section 3.2, an analytical framework to explore the second idea – the phenomenon of GAP as unit of analysis – is developed by adapting the activity system framework embedded in DWR to incorporate the notion of 'in[formal]ity'.

4.1 Theoretical perspective: 'In[formal]ity' as spatial practice

The theoretical perspective developed in this section is a synthesis of three complementary perspectives – dialectic urbanism, counter-conduct, and self-organisation – and sheds light on how the notion of 'in[formal]ity' is embedded in the spatial practice of both residents and local government.

4.1.1 Dialectic urbanism

As discussed in chapter 2, the emergence and rapid growth of informal settlements has become the dominant mode of urbanisation, and it is predicted that this will remain so for foreseeable generations (Revell, 2010: 5; Swilling, 2013: 72). The informal spatial practice that stimulates the development of such settlements can be understood as readily as any other form of urbanism. The notion of 'dialectic urbanism' facilitates such an understanding by describing the urban not as a collection of built artefacts, but as a complex set of social relations – both formal and informal – that is fraught with ambiguity, contradiction, and conflict (Merrifield, 2002: 17). The rigid institutional structures of local government and the complicated formal procedures and instruments that shape urban space add further complexity to these social relations (Parnell, 2014b: 73). At the same time, attention must also be paid to the "popular epistemologies

from which ordinary people draw on a daily basis" (Nyamnjoh, 2012: 146). In order to explicate the notion of 'dialectic urbanism', I will draw on three theoretical perspectives developed by Henri Lefebvre: everyday life (1958), the levels of social totality (1970), and the production of space (1974). In drawing attention to the dialectic nature of urbanism, the discussion on these perspectives develops the notion of 'in[formal]ity' further, so as to enable architectural professionals to develop the informal capacities required to engage constructively with residents in informal settlement upgrading interventions.

4.1.1.1 Everyday life

Lefebvre (1971 [1968]; 1991a [1958]; 2002 [1961]) describes everyday life as being fraught with contradictions. He identifies three components that are combined to constitute everyday life: daily life (*la vie quotidienne*), the everyday (*le quotidian*), and everydayness (*la quotidienneté*). He characterises the latter two as accumulative and dominated sectors, in contrast to daily life, which is neither accumulative nor dominated by capitalism, and where "both the richness and poverty of modern life becomes evident" (1991a [1958]: 89). As the sum of the three components, everyday life entails the familiar, routine, and repetitive daily activities of work, leisure, family life, and cultural production (as indicated in Figure 4.1 (i)). Through its association with that which we take as self-evident and inevitable (whether or not we agree with it), everyday life is the best "guarantee of non-revolution" (Lefebvre, 1991a [1958]: 32). Lefebvre (1991a [1958]: 170) further observes that everyday life involves "social relations more complex than the immediate relations of kinship and primitive economy". Understood as being residual, everyday life fills the "technical vacuum" between formal, structured, and specialised (non-everyday) activities. It is the common ground where differences and conflicts – both within and between – non-everyday activities such as architectural practice can be engaged with (Goonewardena, 2008: 125) (Figure 4.1 (ii)). As such, everyday life realises the notion of 'in[formal]ity' by providing a dialectic space where the contradictions between architectural practice and informal spatial practice can be engaged with. Engagements with residents are often difficult due to architectural professionals' inability to recognise the complex agency involved in everyday life. However, a deeper appreciation of residents' stubborn appropriation of the urban environment, and a sensitivity to the incessant series of manoeuvres that sustains their fragile livelihoods, could address this (Pieterse, 2008: 110-114). In this regard, more concerted attempts to understand the implications of what residents do and to appreciate their capacity to converge in many different combinations would be useful, in particular as

> "… the urban majority discovers itself not in dissecting its practices and identities, not at the ballot box, but by always taking on the challenge of paying attention to and absorbing ways of life that are not always recognisable, of creating urban spaces where nothing is summed up, where residents can try lots of different things without feeling like they are going to mess up the situation for everyone. People come together and discover each other − not because they have to, not because they are fulfilling their responsibilities as citizens – but because the opportunity arose in the midst of people doing other things." (Simone, 2010a: 38; 2014: 333).

Paying attention to residents' everyday life has the potential to continuously inform, expand, and enrich architectural professionals' understanding of their informal spatial practice, to provide clarity while simultaneously posing new questions, and in doing so initiate an endless recursive process of engagement and inquiry (Pieterse, 2013a: 108). In this context it is important to note that architectural practice (like all non-everyday activities) does derive from everyday activities and exists as a critical and alienated expression of informal spatial practice (Goonewardena, 2008: 127) (Figure 4.1 (iii)).

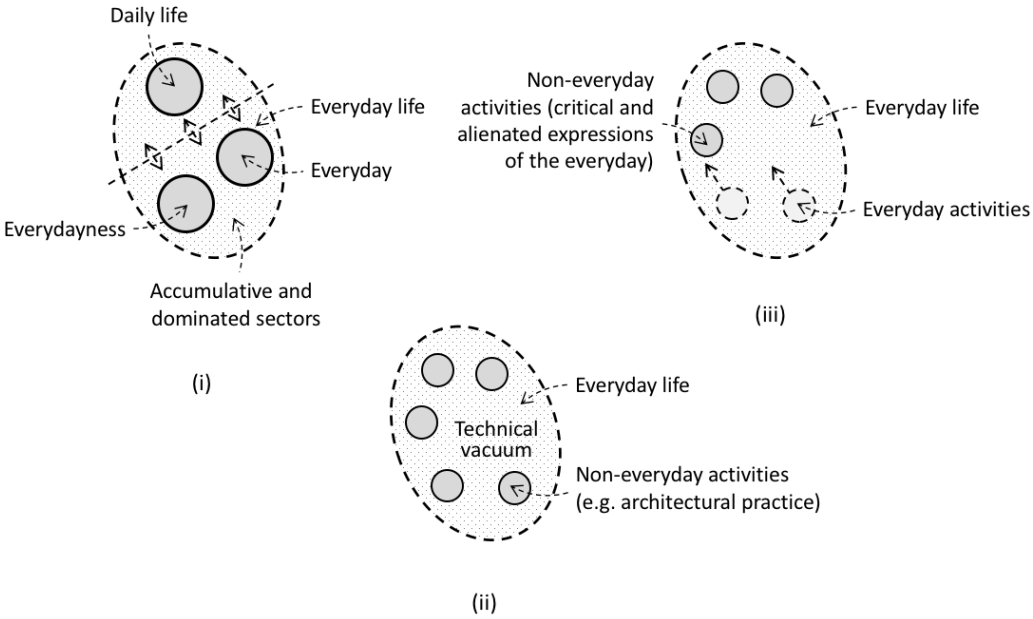

Figure 4.1 Dimensions of everyday life: (i) Daily life, the everyday, and everydayness; (ii) everyday life as the common ground between non-everyday activities; and (iii) non-everyday activities as alienated expressions of everyday activities
Diagram by author, based on Goonewardena (2008: 124-125, 127) and Kipfer (2008: 199)

The notion of 'architecture without architects' (Rudofsky, 1964), which draws attention to the "undeniable power and beauty of vernacular buildings" (Habraken, 2005: 101) also illustrates the extent to which architectural practice has been separated from its roots in everyday life. However, Lefebvre (2002 [1961]: 41) contends that it is impossible for non-everyday activities to be completely detached from everyday life, and that their alienation is a result of the relative autonomy of non-everyday activity. As employed in this research, the notion of 'in[formal]ity' resists this alienation and provides a means of grounding architectural practice in the context of residents' everyday life and informal spatial practice.

4.1.1.2 Levels of social totality

The cities of the global South can be located on a continuum that ranges from informal to formal, with the assumption that the "chaotic, malfunctioning city of informality" must progressively become more formal, thereby transitioning towards "a situation of order, comprehension and optimal functioning" (Pieterse, 2008: 108). For Lefebvre (1971 [1968]: 68; 1976 [1973]: 88), such a transition involves two processes that are inherently neoliberal: internal colonisation (the invasion of everyday life by governmental bureaucracy), and external segregation (the expulsion of entire groups towards spatial, mental, and social peripheries). There is evidence of both these processes in the contextual perspective presented in chapter 2. Lefebvre's concept of 'social totality' (1970) is relevant in this regard and can be applied in two senses in order to challenge both internal colonisation and external segregation. The first is in a normative sense, as a "utopian longing for a radically different way of being"; the second in a descriptive sense, as an epistemological sensibility with which to engage the complexity and interrelatedness of everyday life (Shmuely, 2008: 214). Social totality opposes the alienation between everyday life and non-everyday activities, as well as the fragmentation of knowledge that results from this alienation. Lefebvre's partial and open-ended description of social totality constitutes a dynamic and continual spatiotemporal process that fosters a relational understanding of complex phenomena without the constraints of overly systemic thinking (Lefebvre, 1991b [1974]: 399; Shmuely, 2008: 215). This perspective offers a remedial strategy to the discredited urban development paradigms of the twentieth century, which are subject to critique on the basis of the static nature of their ideological approaches. As such, there is a need to reconceptualise the urban as "a complex ecosystem of barely balanced chaos and flux" (Dodd, 2011: 9-10). In this ecosystem, space becomes a productive force that expresses social relationships (such as those between residents and local government) and also reacts against them.

This dialectic perspective on space is embedded in Lefebvre's concept of 'the level' (1970), which combines mobility and structure by "expressing a complexity which is differentiated yet structured within a whole (a totality)" (Goonewardena, 2008: 127). The articulation of three levels – the global (G), urban (M), and everyday life (private: P) – that cannot be completely dissociated from each other enables the visualisation of gaps, sudden transitions, and (potential) imbalances between levels. These gaps, transitions, and imbalances are addressed by means of mediation, either within a particular level or as an interpenetration between levels (Lefebvre, 2002 [1961]:

119). In their interpretation of Lefebvre's work, both Kipfer et al. (2008a: 290; 2008b: 14) and Shmuely (2008: 221) note the extent to which global phenomena (the macro-order of society) impact on the private realm (the micro-realities of everyday life), and they describe Lefebvre as understanding the urban as an intermediary between these two levels. Accordingly, the levels of social totality are related to each other through mediation and extend from the global through the urban to everyday life. Within this context, Lefebvre describes the state (rather than market forces or social relations) as shaping the course of a society. As discussed above, he understands urban governance (a non-everyday activity) as a derivative of everyday life, and subsequently questions why residents fail to realise that they "are the soil on which the edifice rests" (Lefebvre, 2005 [1981]: 122). According to this understanding, the global and private levels are the "very horizons of the hegemonic struggle", and the strategic assemblage of capital and state at level G endeavours to govern everyday life at level P by regulating the urban "battlefield" at level M. Conversely, as indicated in Figure 4.2, the "revolutionary capabilities and practices" of residents at level P have the potential to influence level G through a similar occupation of the urban (level M) (Shmuely, 2008: 221). Seen in relation to the notion of 'in[formal]ity', the levels of social totality draw attention to the contested nature of the interactions between urban governance and informal spatial practice.

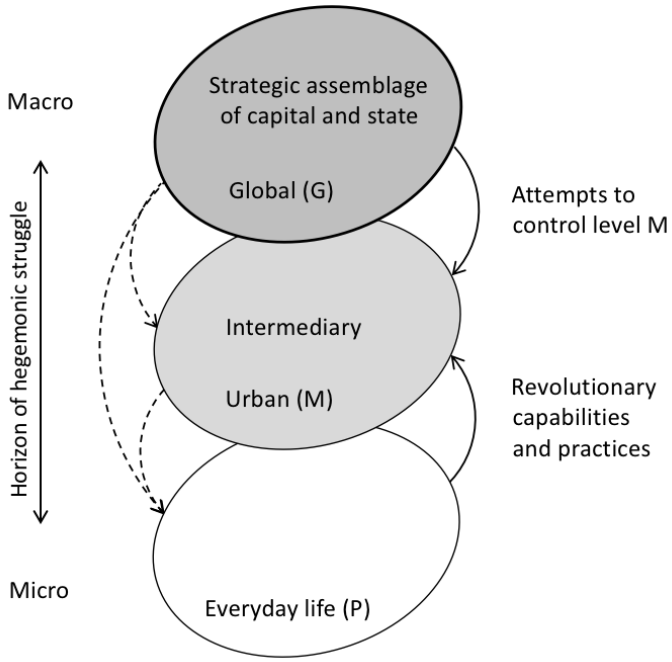

Figure 4.2 Levels of social totality: Global, urban (mixed), and everyday life (private)
Diagram by author, based on Lefebvre (2003 [1970]) and Shmuely (2008: 221)

4.1.1.3 Production of space

Lefebvre (1991b [1974]) draws a distinction between the abstract space of capitalism and the differential (social) space of everyday life. The former emanates from level G, and instead of accommodating informal spatial practice it promotes "homogeneity and suppresses difference" (Milgrom, 2008: 264). Differential space, in turn, is generated by the contradictions inherent in abstract space, and embraces and enhances social difference. In contrast to the "utopias of spatial form" promoted by the modernist movement, differential space holds the potential to "build a utopianism that is explicitly spatiotemporal" (Harvey, 2000: 182). In the global South, building such a utopianism entails drawing on informal spatial practice to foster transitions to sustainable urbanism. This is a departure from conventional approaches toward socio-technical transitions, which generally resemble abstract space in their negation of residents' everyday lives, suppression of diversity, and assumption of a standardised and static social structure. In contrast to such conventional approaches, the transitions to sustainable urbanism contemplated in the research presented here resemble differential space, in that the notion of 'in[formal]ity' "embraces the diversity of urban dwellers and assumes that ever-changing populations continually produce urban space" (Milgrom, 2008: 265).

Lefebvre (in Kipfer, 2008: 200) describes three interrelated and dialectic dimensions to space, i.e. conceived space (based on knowledge and ideology), perceived space (based on use and materiality) and lived space (based on meaning and symbolism) (Figure 4.3). This conceptual triad is a tool for engaging with "fuller, richer and more textured accounts of ordinariness in African cities", so as to develop a more comprehensive understanding of the spatiality of the urban (Pieterse, 2011: 12). Conceived space is informed by knowledge and ideology, and entails

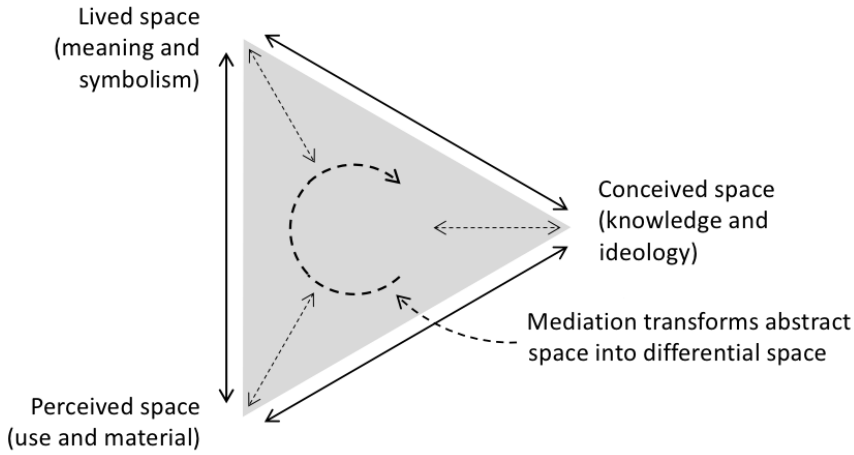

Figure 4.3 The production of space according to Lefebvre's conceptual triad
Adapted from Milgrom (2008: 270)

representations of space that exist both as designs (drawings and images) and as the manifestation of such designs in the built environment (urban form). Lefebvre (1991b [1974]: 116) describes conceived space as the dominant space in any society, and states that the history of ideologies can be studied by exploring how plans of a space change over time. As such, conceived space pertains to a manipulation of space through different representations thereof and informs the spatial discourse that guides the actions of architectural professionals (Briercliffe, 2015: n.p.). Conceived space suggests how residents might live, not only by determining the configuration of urban form, but also by making assumptions about residents' spatial practice. As a result of their engagement with conceived space, architectural professionals "cannot help but generalise and universalise their discourse, in other words, to speak for people instead of with them" (Dutton, 1996: 194). In his exploration of urban space in Malawi, Mwathunga (2014: 5, 88) analyses representations of space (drawings and images, as well as urban policy) in order to develop an understanding of the ways in which conceived space – as produced by the combination of (technical) knowledge and ideology – contradicts residents' spatial practice.

The second spatial dimension in Lefebvre's conceptual triad, i.e. perceived space, relates to the spatial practice that emanates from engagements with the built environment, and to the ways in which residents use space. Spatial practice denotes the material, concrete, and tangible dimensions of social activity and interactions, and is the outcome of choices made in navigating space: "a physical and experiential deciphering of space" that involves a negotiation between everyday life (level P) and urban reality (level M) (Lefebvre, 1991b [1974]: 38; Briercliffe, 2015: n.p.). As such, it is important that architectural professionals develop an understanding and acceptance of informal spatial practice, as the "unique, hybrid, informalised modernities" (Pieterse, 2011: 13) that result from such practice has the potential to instigate new conceptions of space (Milgrom, 2008: 277). The third and last of the dimensions in Lefebvre's triad, lived space, pertains to the meaning and symbolic values that are produced in reaction to the built environment (Milgrom, 2008: 269-270). Also referred to as "representational space", this is the most theoretical of the three dimensions of the conceptual triad, referred to by Lefebvre (1991b [1974]: 39) as

> "… space as directly lived through its associated images and symbols. This is dominated space – and hence passively experienced – space which the imagination seeks to change and appropriate. It overlays physical space, making symbolic use of its objects."

As such, lived space combines aspects of both perceived and conceived space, and represents residents' experience of space in everyday life (Mwathunga, 2014: 5). Accordingly, in response to the state's (often unsuccessful) imposition of conceived space, which stands in contrast to the spatial practices and lived space of residents, lived space is the space where ideals and social movements originate (Mwathunga, 2014: 54; Briercliffe, 2015: n.p.). Space itself is not a neutral container, and it influences social processes that in turn determine representations of space, spatial practice, and representational space. As such, the production of space is an ongoing and

iterative process, with space continually changing as conceptions, perceptions, and lived experiences change (Milgrom, 2008: 269-270). This interaction implies that the predominant struggle in society is spatial (rather than class-based) and that residents have the agency to create revolutionary forms of differential space (Mwathunga, 2014: 83). In order for Lefebvre's "urban revolution" to become a reality, the hegemony of formal urban development must be countered by the collective action of residents on level M (Gilbert & Dikeç, 2008: 254). The transformation of abstract space into differential space is achieved by a mediation between the three dimensions of the conceptual triad, and architectural professionals – who are adept at engaging with local government in the production of conceived space – are urged to engage with the lived space of residents so as to foster the emergence of differential space (Milgrom, 2008: 273; Briercliffe, 2015: n.p.). As such, architectural practice has the potential to transform abstract space into differential space by mediating between local government and residents so as to realise the notion of 'in[formal]ity'.

4.1.2 Counter-conduct

Whereas the notion of 'dialectic urbanism' understands the urban as a complex set of social relations, the concept of 'counter-conduct' draws attention to the actions of residents in response to that of local government. The spatial rationalities of local government – which underlie the aspiration to transform "what is" into "what ought to be" (Huxley, 2005: 92) – are made visible by the techniques and practices employed by local government. Having been diffused by forces such as colonialism, modernism, and globalisation, these techniques and practices often derive from other developmental contexts. This universalisation is not always the result of imposition from the outside, but often the result of local government "seeking a quick solution through a cut-and-paste from a 'best practices' website" (Watson, 2007: 68). However, as evidenced in the earlier discussion on informal settlement upgrading and government policy (section 2.1), the rationalities that underpin urban development policy have begun to shift towards an acceptance of and positive response to social difference and multiculturalism (Watson, 2007: 71, 77). However, in practice, a transformational rationality focused on residents and their context-specific needs and aspirations has not yet been realised (Low, 2013: 152). The technical, neoliberal rationality that informs the majority of local government upgrading interventions produces economically driven, structured, and formal spaces that residents have to alter in order to satisfy their needs and aspirations (Massey, 2014: 295). This spatial adaptation, essentially the transformation of abstract space into differential space so as to restore socially-based livelihood strategies, is often interpreted as a return to informal spatial practice. Massey's doctoral research (2013b) on women's social networks and informal settlement upgrading in Gugulethu and Khayelitsha employs the concept of 'counter-conduct' (Foucault, 2003 [1978]), which relates to the practices and techniques that individuals or groups employ in order to resist government conduct and mentalities. Counter-conduct is understood as the after-effect of power, and in the context of informal settlement upgrading it

often manifests as the perceived return to informal spatial practice as residents reinstate their livelihood strategies. Counter-conduct does not necessarily propose radically different approaches, and instead of open protest or direct confrontation it entails the regaining of power that has been lost during the upgrading process. It is more pragmatic than normative, and most often exists on a small scale, taking the form of individual behaviour or structured group action (Massey, 2014: 291-295). As such, counter-conduct emerges as informal and pragmatic solutions to the disruption and challenges brought about by local government upgrading interventions, and the practices that residents employ generally develop without conscious consideration of their underlying rationalities (Massey, 2013b: 53).

4.1.2.1 Conflicting rationalities

For *in situ* upgrading interventions to constitute a transition to sustainable urbanism, both residents and local government require a more thorough understanding of the former's rationalities (Massey, 2013a: 612). Anthropological research also draws attention to the conflicting rationalities of local government and residents, referring to engagement in the urban economy and the accompanied sense of competition between people as a form of moral degradation that erodes the values of reciprocity and mutual assistance (Ngxabi, 2003: 53). Watson (2007: 68) understands this anthropological interpretation as reflecting the contradiction between urban living – with its associations of modernity and individualisation – and the communal nature of Xhosa culture[1]. This interpretation understands counter-conduct as more than the direct result of increased urbanisation, and sees it as indicative of larger failings within local government approaches to informal settlement upgrading (Massey, 2014: 291). The counter-conduct observed in upgraded settlements is guided by the same informal techniques and practices that were present before the upgrading occurred: verbal communication, regular meetings, informal voting systems and member registrations, as well as verbal agreements that carry the same weight as formal contracts (Massey 2013a: 178; 2014: 295). As such, counter-conduct reflects the autonomous efforts of residents to create space for their interests and desires by transforming the abstract space imposed by local government into differential space (Pieterse, 2008: 112). Together, these actions of local government (upgrading interventions) and residents (counter-conduct) result in "combined and continuous processes of informalisation, integration, and re-informalisation" that are not conducive to transitions to sustainable urbanism (Bayat, 1997: 61). Accordingly, so as to be both just and sustainable, upgrading interventions must be based on decisions reached through collaborative processes that involve all stakeholders, residents in particular, so as to avoid unintended and negative outcomes (Massey, 2013b: 180; 2014: 293). Such approaches regard urban development as a continuous, temporal process (Low, 2013: 151-155). In giving precedence to human capital over formal design by means of intensive participation and respect for pre-existing conditions, they have the potential to contribute to the production of a rich and diverse range of architectural and urban interventions (ibid.).

[1] The residents of informal settlements in Cape Town are predominantly isiXhosa speakers (Frith, 2011).

4.1.2.2 Indigenous modernities

For the most part, however, the conflicting rationalities of local government and residents result in the selective acceptance of upgrading interventions. The concept of 'indigenous modernities' is relevant in this regard, as it draws attention to the ways in which upgrading interventions are resisted, embraced, reshaped, or accommodated depending on the specific context (Robins, 2003: 1). Indigenous modernities refer to the (often unrecognised) multiple and diverse design approaches employed in "a broader search for humane dimensions in settlement making" (Low, 2013: 151). Common ground can be reached as a first step towards understanding counter-conduct only by accepting the contextual nature of values, and the fact that conflicting rationalities must, as such, be addressed through local knowledge (Watson, 2007: 77). Accordingly, upgrading interventions must be based on a relational understanding of society that recognises both differences and commonalities, and on "situated judgement with and for others", rather than on the imposition of fixed values (Campbell, 2002: 282). As such, indigenous modernities relate to the concept of 'situational ethics', which rejects both foundational and relativistic ideas of norms in favour of contextually grounded norms (Watson, 2007: 76). Drawing on De Boeck (1996), Watson (2007: 72-75) refers to identity (in Africa) as often being the self-constructed product of three processes: hybridisation, fusion, and cultural innovation. Engaging in these processes, residents embrace upgrading interventions (and modernity, at a larger scale) in a context-specific manner that fuses local government rationalities and practices with their own livelihood strategies. It is crucial that local government officials understand these hybrid practices, as the counter-conduct that they stimulate is a valuable source of innovation to inform contextually appropriate upgrading interventions. Failure to understand residents' informal spatial practice results in local government officials making inaccurate assumptions about counter-conduct, leading to strategies, policies, and practices that damage residents' social networks and livelihoods, thereby making informal settlements less, rather than more, sustainable (Massey, 2014: 291, 295). Therefore, local government requires a "fine-grained, situated, qualitative understanding of the everyday lives of ordinary people" to inform upgrading interventions (Watson, 2007: 76).

4.1.2.3 Conceded informality

On the other end of the spectrum from indigenous modernities, the concept of 'conceded informality' provides a different (and arguably less just) perspective on local government engagement with informal spatial practice. Developed in the context of the rapidly urbanising Pearl River Delta in China, conceded informality is understood as an implicit and differentiated system of approaches that enables the flexible management of informal spatial practice. Such management is informed by the relevance, usefulness, and potential threat of such practice to government authority. As such, local government remains the dominant decision-maker and deems which grassroots initiatives are acceptable and suitable for incorporation into the formal urban governance system. If informal spatial practice offers adequate solutions to newly

emerging problems or unregulated niches, it is often incorporated into government policy[2]. Conceded informality is particularly useful in the global South, where the regulatory power of government often extends over a limited part of social reality. Local government then makes use of its resources strategically, neither attempting to fully formalise urban development nor condoning informal practices entirely. This approach then allows local government to readjust to constantly changing circumstances over time and to gradually build up efficient policies pertaining to informal spatial practice. Conceded informality is premised on five strategies: (i) actively supporting informal spatial practice when it assists in closing institutional gaps, (ii) promoting informal spatial practice when it produces new strategic knowledge, (iii) utilising informal spatial practice when it provides flexible guiding principles to serve a political goal, (iv) tolerating informal spatial practice when it assists development, and (v) overcoming informal spatial practice when other important (often economic) interests prevail (Schoon & Altrock, 2014: 216-219). The wide spectrum between indigenous modernities and conceded informality (both of which offer a perspective on counter-conduct) reiterates the dialectic nature of 'in[formal]ity', and the challenge of engaging with upgrading interventions in a manner that constitutes a just transition to sustainable urbanism.

4.1.3 Self-organisation

Self-organisation provides a third perspective on 'in[formal]ity' as spatial practice, and focuses on the action of residents themselves, independent of that of local government. In the context of urban development processes, self-organisation is a social innovation that involves vision and action building to stimulate sustainable improvements in the economic, physical, social, and environmental conditions of urban environments that are undergoing change. When exercised in partnership with local government, social innovation constitutes an emerging form of governance that grows from the context of intervention. This enhances not only the suitability of interventions to local circumstances, but also the commitment of local stakeholders and the implementation potential of the intervention (Van Meerkerk, Boonstra & Edelenbos, 2013: 1630).

4.1.3.1 Civic initiatives

Where, in the past, civic initiatives in the spatial realm were a fringe movement, they are now coming to the fore as valuable strategies for urban development. Not only residents, but local artists and entrepreneurs too, take part in civic initiatives out of communal interest and with local government and the market (e.g. property developers and housing corporations) (Boonstra, Vogel & Slob, 2014: 258). Civic initiatives are best understood when seen as a form of self-organisation, where the actions of internal actors, including residents and local organisations,

[2] The incorporation of grassroots reblocking practices into local government policy in Cape Town (Proactive Reblocking Policy, as discussed in section 2.1) is an example of this.

their own resources[3]. This represents a significant departure from urban development driven by are emphasised (Boonstra, 2015: 59). Furthermore, civic initiatives aim to foster small-scale, incremental change, and in contrast to mega-projects, the trickle-up effect of self-organised systems has the potential to produce the most meaningful change (Hamdi, 2004: xvii). Self-organised organisations often emerge organically in response to material deprivation, and are characterised by a commitment to internal democracy and accountability through regular leadership elections. These organisations inculcate a commitment to a rights-based approach to urbanism, and in holding local government to account, they are best placed to oppose and eradicate the corrupt political forces that predominate in South Africa (Pieterse, 2013a: 105). In this regard, self-organisation refers to the "limits imposed on the steering capacity of a single actor by the autonomy of other actors and their ability to behave and organise as they choose" (Boonstra & Boelens, 2011: 109). The concept of 'self-organisation' can be used as a theoretical lens to explore the emergence and development of civic initiatives that represent counter-conduct, where residents take actions that fall outside of the ambit of local government procedures. Self-organisation further emphasises the ongoing interaction between the various constituent elements of a system, and draws attention to processes of becoming rather than being (Van Meerkerk et al., 2013: 1631). As such, self-organisation is defined as

> "… the emergence and maintenance of structures out of local interaction, an emergence that is not imposed or determined by one single actor, but is rather the result of a multitude of complex and non-linear interactions between various elements" (Van Meerkerk et al., 2013: 1632).

A spatial interpretation of the concept of 'self-organisation' understands the urban (level M) as a self-organising system where a "superstructure layer of free agents" overlays an infrastructural layer that includes (amongst other elements) street networks, land parcels, and dwelling units (Portugali, 2000: 86). This interpretation reflects the view that society is the result of more than one, governmental perspective, and includes a variety of diverse and dynamic elements. As such, civic initiatives involve networks of residents who act autonomously in ways that are beyond the control of local government (Boonstra & Boelens, 2011: 103). In terms of the levels of social totality, this implies an expansion of level M so as to facilitate the dialectic relationship between local government and residents.

4.1.3.2 Participation

In the context of urban development, and informal settlement upgrading in particular, self-organisation refers to situations where residents and other stakeholders engage in specific networks out of their own interest and motivation. If so required, these engagements can be

[3] In Cape Town, the World Design Capital distinction awarded to the city in 2014 was a major stimulus for local artists and entrepreneurs to take part in civic initiatives. However, the project's engagement with issues of urban poverty and informal spatial practice has also been widely critiqued as being superficial and exclusionary (see Rawoot, 2014, as an example).

facilitated (but never directed) by local government officials or architectural professionals. As such, self-organisation offers a post-structuralist view on space, geography, and planning that regards urban development as being open and relational rather than closed and contained. By virtue of emerging from civic initiatives, self-organisation is a more legitimate approach to urban development than "conventional arrangements linked to hierarchical-instrumental policymaking" (Van Meerkerk et al., 2013: 1650). The implication of this statement is that local government should shift from a participatory planning paradigm to one of active citizenship, so as to allow for the inclusion of civic initiatives and other constructive forms of informal spatial practice. This involves the development of inclusionary procedures to allow for issue-oriented interventions[4] with loose and informal structures that are able to expand in geographical and social terms as interventions unfold (Boonstra, 2015: 57-58). If local government accepts and even stimulates civic initiatives, self-organisation has the potential to establish a new relationship between local government and residents, one that creates space for the actual motives, networks, communities, processes, and objectives of residents themselves (Boonstra & Boelens, 2011: 106). In the face of ineffective participatory practice by local government, however, the alternative is to institutionalise self-organisation so as to create new power bases that remain autonomous when confronted with conflict, negotiated settlement, and cooperative partnerships. This will require a model of self-organisation that is easy to replicate, context-appropriate, flexible, and independent of external or professional leadership (Swilling, 2008: 502-503).

4.1.4 Conclusion

The three perspectives presented in this section – dialectic urbanism, counter-conduct, and self-organisation – shed light on how the notion of 'in[formal]ity' is embedded in the spatial practice of both residents and local government, as indicated in Figure 4.4. The notion of 'dialectic urbanism' illustrates the complex and contested nature of spatial practice in an urban context, counter-conduct relates to residents' responses to local government action that disregards their informal spatial practice, and self-organisation to action undertaken by residents in the absence of appropriate local government interventions. In its expanded form, level M recognises informal spatial practice and facilitates the dialectic relationship between local government and residents, and contextualises the counter-conduct (responses to inappropriate local government action) and self-organisation (responses to a lack of local government action) of residents. Both of these concepts draw attention to the importance of the relationship between local government and residents. As such, the exploration of GAP that is undertaken in the research presented in this dissertation requires an analytical framework that is sensitive to the contested nature of informal settlement upgrading, and the dialectic nature of 'in[formal]ity' in particular.

[4] The work of VPUU, being organised around the overarching aim of promoting safety and security through urban upgrading, is an example of an issue-oriented intervention.

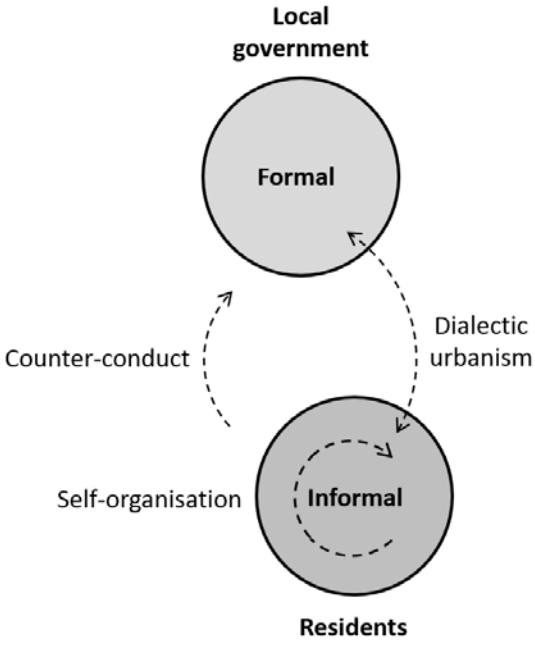

Figure 4.4 A theoretical understanding of 'in[formal]ity' as spatial practice
Diagram by author

4.2 Third generation activity theory

The activity system framework embedded in DWR, the research methodology that I employ in the niche-level exploration of GAP, derives from third generation AT. In this section, I will introduce the activity system framework and adapt it by incorporating the notion of 'in[formal]ity'. This adaptation responds to researchers' calls (e.g. Simone, 2004a: 18; Parnell & Robinson, 2012: 602) for a post-neoliberal theoretical agenda that engages creatively with informal spatial practice, negating the dominance of colonial and postcolonial perspectives in order to appreciate the modernity, innovation, and resourcefulness embedded in such practice. By employing a model of networked activity systems, I am able to supersede "binary depictions" (Oldfield et al., 2004: 285), "oversimplified dualistic analysis" (Angotti, 2006: 962), and "virtually meaningless distinctions such as 'formal' and 'informal'" (Pieterse, 2013b: 13). Instead, the continuities and interdependencies between supposed binaries are made evident, enabling an understanding of and appropriate response to informal spatial practice (Pieterse, 2005: 53). This more generous conceptualisation of urbanism incorporates a fluidity of identities and scales of action (Oldfield, 2014: 255), and challenges the nature of the relationship between residents and local government.

4.2.1 Object-oriented and networked activity systems

4.2.1.1 Unit of analysis

AT is concerned with "doing in order to transform something", and posits the activity system indicated in Figure 4.5 as a unified dynamic whole that constitutes the minimum meaningful context for understanding human actions (Engeström, 1991b: 267; 1993: 67). Activity differs from other types of interaction in two ways: firstly, the subjects of activities have needs which they aim to meet through an interaction with the world (i.e. by acting upon an object); secondly, subjects and their activities mutually determine one another, in that activities are generative forces that transform both subjects and objects (Kaptelinin, 2013: n.p.). The first generation of AT introduced a triangular model of a "complex, mediated act" consisting of a subject, an object, and a mediating artefact (Vygotsky, 1978: 40). The agency of the subject – an individual (first generation AT onwards) or a group (second generation AT onwards) – is the point of view employed in the analysis, with the unit of analysis being an object-oriented and artefact-mediated activity system framework that enables the mapping of activity as it unfolds over time (Engeström, 1999c: 6).

Within this framework, objects are understood as being raw materials, conceptual understandings, or even problem spaces at which the activity is directed so as to achieve the outcome desired by the subject (Engeström, 1987: 79, 1993: 67; Ekundayo, Wang & Andrade, 2012: 3). The dynamic, yet indirect relationship between the subject and object is mediated by artefacts, which can take the form of physical tools, cognitive signs or symbols, other people, or even processes (Vygotsky, 1987: 45; Barab, Barnett, Yamagata-Lynch, Squire & Keating, 2002: 78). Artefacts both alter and are altered by activity, and their properties are developed over time as they are employed by different people in different contexts (Hardman & Amory, 2015: 18). As such, the experiences of others who have employed an artefact "accumulate in the structural properties of the [artefact] as well as in the knowledge about how the [artefact] should be used" (Arnseth, 2008: 292). From this follows that artefacts can be imbued with different symbolic meanings within specific cultures (Guldberg, 2010: 170).

In second generation AT, the unit of analysis is expanded from individual action to collective (group) activity, and the social elements of community, rules, and division of labour are introduced to the activity system framework (Barab et al., 2002: 78; Hardman, 2007: 9; Guldberg, 2010: 170-174; Sannino, 2011: 573). The community is the group of individuals who share the object with the subject, and constitutes the socio-cultural context of the activity (Ekundayo et al., 2012: 3). Two other elements emanate from this socio-cultural context: the community's shared rules and their division of labour. Rules can be formal (systematic, general, and expected), informal (idiosyncratic adaptation), or technical (mandated and potentially written), and by influencing the subject's actions in the collective activity they constrain the activity system to a certain extent (Barab et al., 2002: 78-79; Hardman & Amory, 2015: 18). Rules

constitute the "codified, stable, and universally agreed upon" norms and conventions that sustain socio-technical regimes by guiding the everyday practices of its members (Geels, 2004b: 32-34; Geels & Schot, 2007: 400). The final social element of the activity system framework is the division of labour (both horizontally and vertically) within the community, this division pertaining to the continually negotiated responsibilities, tasks, and power relations that inform collective activity (Barab et al., 2002: 79; Hardman & Amory, 2015: 18).

In the course of their activity, subjects engage in mediational processes that alter the relationship between the elements of the activity system as they employ existing or create new (mediating) artefacts in order to achieve the desired outcome of the activity (Yamagata-Lynch, 2010: 16). Furthermore, the relationship between subject and community is mediated by rules, and the relationship between object and community is mediated by the division of labour (Ekundayo et al., 2012: 3). As such, AT perceives practice (and by implication, GAP) as a complex system of mediated interactions between subjects, communities, and the object of their activity (Ferreira et al., 2010: 4).

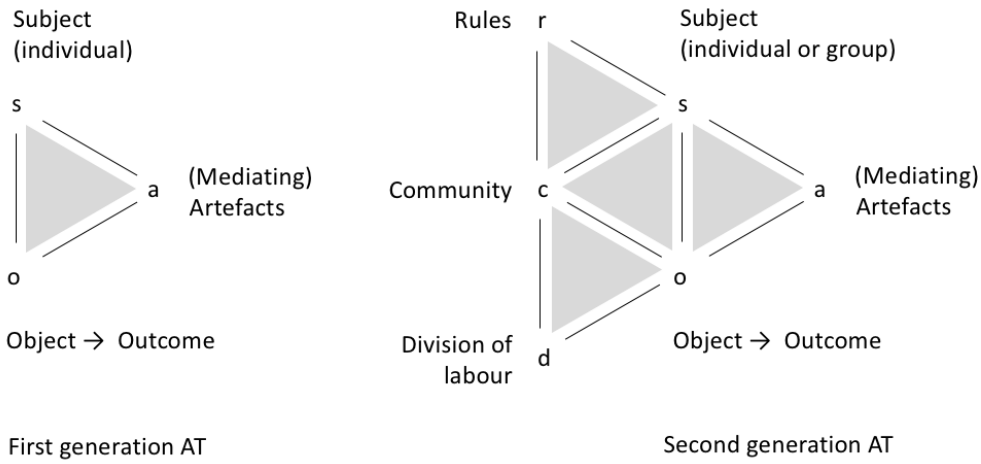

Figure 4.5 The first two generations of AT: A mediated act and its social context
Adapted from Vygotsky (1978: 40) and Engeström (1991a: 79)

4.2.1.2 Contradictions

By virtue of its inclusion of social elements (community, rules, and division of labour), second generation AT is attuned to the conflictual nature of social practice (Engeström, 1999b: 9), and by implication, the dialectic nature of 'in[formal]ity'. As the relationship between the elements of an activity system changes over time, structural tensions accumulate within (and between) activity systems (Engeström, 2008: 57; Yamagata-Lynch, 2010: 16). These structural tensions become manifest as problems, ruptures, breakdowns, clashes, or disturbances that temporarily interrupt the activity and are referred to as "contradictions". In particular, contradictions occur when new elements are introduced into the activity system, and emerge at various levels within or between activity systems (Ekundayo et al., 2012: 2; Abdullah, 2014: 73), as indicated in Figure 4.6. Primary contradictions are located within a single element, secondary contradictions between two elements, tertiary contradictions between the object of an activity and the object of a more advanced form of the same activity, and quaternary contradictions between an activity and neighbouring activities in its network relations (Ekundayo et al., 2012: 4-5; Hardman & Amory, 2015: 19). The primary contradiction of all activities located in capitalist socio-economic formations is that between the exchange value and use value within each element of the activity system. Secondary contradictions occur between elements when new elements enter the activity system, while tertiary contradictions appear when a more advanced object motive (e.g. new government policy) is introduced into an activity. Lastly, quaternary contradictions emerge between the transforming central activity and its neighbouring activities as they interact with each other (CRADLE, [n.d.] b). As a dialectic whole to facilitate an understanding of the relationship between formal urban development and informal spatial practice, 'in[formal]ity' often involves quaternary contradictions between the activities of residents and local government.

Contradictions in activity are often repaired or negotiated in the course of everyday activity, and some may not even be obvious to all participants if they do not share the same motivation for engaging in the activity (Meyers, 2007: n.p.). Nevertheless, understanding contradictions as a dynamic site of change that drives the transformation of activity, researchers are able to anticipate where transformation is likely to occur based on the level at which the contradiction is located (Ekundayo et al., 2012: 4-5; Hardman & Amory, 2015: 19). As such, contradictions are the "motive force of change and development" (Engeström, 1999b: 9) and have become a "guiding principle of empirical research" (Engeström, 2001: 135). Urban development continually evokes contradictions, and in the global South in particular these give rise to the informal spatial practices that residents employ to reconfigure urban space and to generate new modes of self-organisation outside of the formal, regulated system (Cirolia et al., 2016: 4). Contradiction-driven development is also a feature of socio-technical transition theory (STT)[5], where system innovations (the fundamental reconfiguration of technologies, markets, institutions, knowledge, consumption practices, and cultural norms) occur when a disruption in a particular socio-technical system stimulates the emergence of a new system structure (Geels, 2011: 24).

[5] Refer back to subsection 1.1.4 for an introduction to STT.

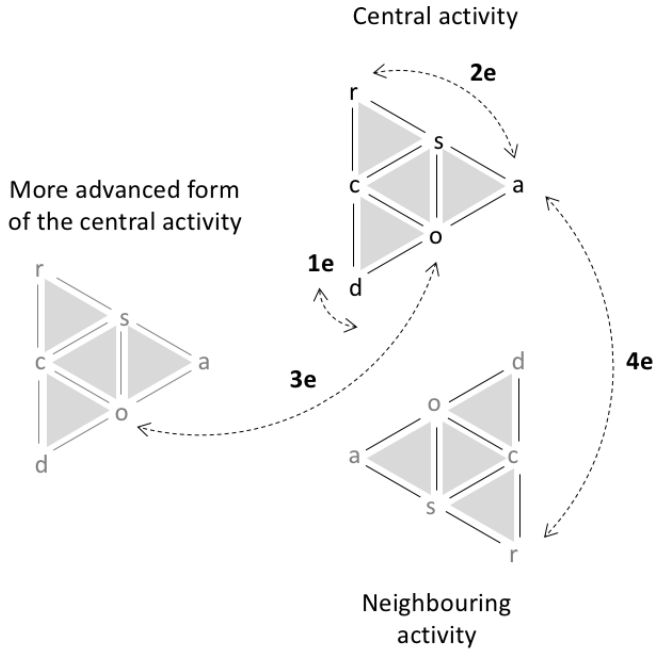

Figure 4.6 Four levels of contradictions: Primary (1e), secondary (2e), tertiary (3e), and quaternary (4e). Adapted from CRADLE ([n.d.] b)

4.2.1.3 Partially shared objects

Objects are described as being simultaneously (i) given (being present in material or nonmaterial form), (ii) socially constructed (entailing different representations regarding different social relations), (iii) contested (presenting different understandings according to different standpoints), and (iv) emergent (in that they are susceptible to changes) (Ferreira et al., 2010: 4). As such, in contexts of profound complexity – such as informal settlement upgrading incorporating the notion of 'in[formal]ity' – second generation AT has proven insufficient to interrogate the diversity and dialogue that exists between different traditions or perspectives. As a response to this, third generation AT has developed conceptual tools to understand multiple perspectives and voices. It has done so by expanding the activity system framework to include two interacting activity systems with a partially shared object (PSO) (CRADLE, [n.d.] a) (Figure 4.7 (i)). Thus, the unit of analysis is expanded both up and outward, and down and inward. By expanding up and outward, the exploration of networked activity systems and their (often fragmented) PSOs is made possible. Conversely, by moving down and inward, third generation AT elucidates issues of subjectivity, experiencing, personal sense, embodiment, identity, and moral commitment (Engeström, 2009: 308). Engeström (2008: 56-57) describes third generation AT by noting five principles that build on the previous generations of AT:

- The prime unit of analysis is a collective, artefact-mediated, and object-oriented activity system that realises and reproduces itself through action, seen in its network relations to other activity systems.

- Activity systems are multi-voiced, and as such entail continual negotiation. Participants have their own diverse histories, and the activity system itself has multiple layers and strands of history embedded in its artefacts, rules, and division of labour.

- Activity systems take shape and transform over extended periods of time, and as such constitute a suitable framework for analysing ongoing practice (such as GAP).

- Contradictions play a central role as sources of change and development. Activity systems are open and able to adopt new elements from outside, often resulting in aggravated secondary contradictions where an existing element collides with a new element.

- The object and desired outcome of an activity system are reconceptualised to embrace a radically wider horizon of possibilities than before. These possibilities emerge as researchers and practitioners engage in a collective journey through the zone of proximal development (ZPD)[6] of the activity concerned.

Through their engagement in activity, people constantly transform existing objects and create new objects. The latter are often not intentional products of a single activity, but the unintended consequence of multiple activities. Such objects are referred to as runaway objects, and have the potential to escalate and expand so as to influence the socio-technical landscape. Runaway objects are not under the control of any particular individual or group, and have potentially far-reaching and unexpected effects. As such, they are contested objects that generate opposition and controversy. Notwithstanding this, runaway objects have the potential to become powerful emancipatory objects that open up radically new possibilities for development and well-being. Runaway objects often emerge as small problems or marginal innovations (e.g. the reblocking of an informal settlement), and this makes their runaway potential difficult to predict and to utilise, particularly if they remain dormant, invisible, or unseen for extended periods of time before emerging as acute crises or breakthroughs. As they develop, runaway objects become affiliated with numerous activity systems and are increasingly characterised by their undefined boundaries and pervasiveness (Engeström, 2009: 304-305).

The research presented in this dissertation is concerned with the construction of PSOs between the activity systems of local government and residents in transitions to sustainable urbanism. This is challenging, as runaway objects that pertain to socio-technical innovations are "typically seen as objects for relatively exclusive professional expert activities" and other stakeholders (such as residents) are often marginalised (Engeström & Blackler, 2005: 307). In this context,

[6] The ZPD is a hypothetical learning space, as introduced in subsection 1.4.2.

third generation AT assists in the actualisation of residents' right to the city by providing a framework that recognises their informal spatial practice as an activity system that is networked with that of local government (Figure 4.7 (ii)). Transitions to sustainable urbanism in Cape Town (premised on the *in situ* upgrading of informal settlements in collaboration with residents and local organisations) satisfy the prerequisite that benign runaway objects must have intrinsic properties that transcend the limits of utilitarian profit motive. As such, benign runaway objects are situated

> "… at the boundary between legitimate and illegitimate, sensible and crazy, work and leisure, technology and art. These properties are experienced in acting on and with the object over a long haul, with persistence and patience, oscillating between intensity and withdrawal. The object must yield useful intermediate products, accessible and cumulable – allowing participants to return time and again. There must be effective feedback from and exchange among the participants acting on the object." (Engeström, 2009: 306).

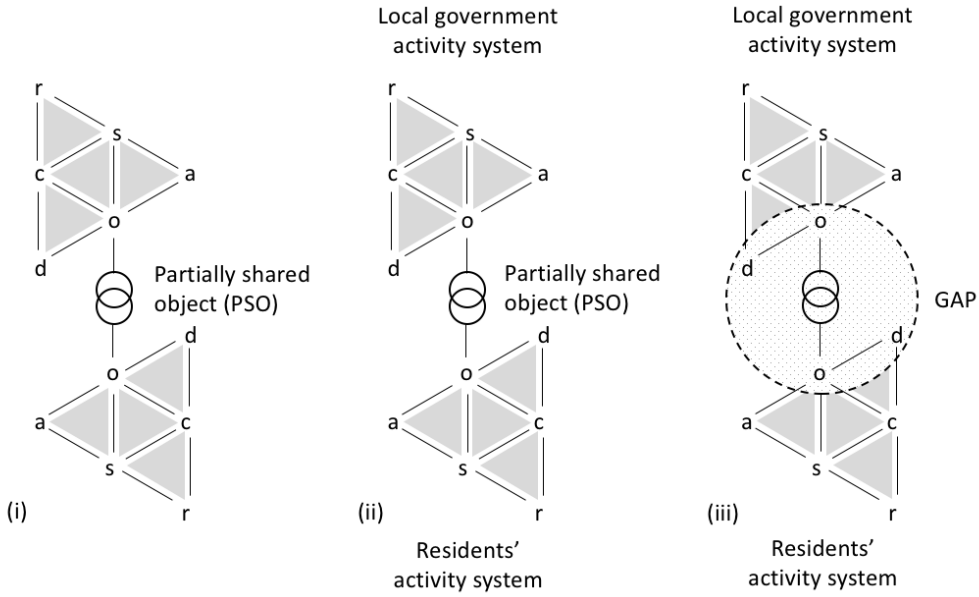

Figure 4.7 Employing third generation AT to represent GAP: (i) Two networked activity systems and their PSO, (ii) recognising informal spatial practice, and (iii) GAP as an intermediate conceptual tool emanating from the boundary zone between the networked activity systems of residents and local government
Diagram by author, based on Engeström (2008: 56)

When engaging with runaway objects, architectural professionals require relational agency so as to "work with others in pursuit of ever expanding objects and to explore the possibilities that these new objects reveal" (Edwards, 2007: 6). This entails a shift from exploring individual practices towards exploring the boundary zone between activity systems, and requires the development of intermediate conceptual tools to elucidate the complex social practices that occur at this nexus (McMillan, 2009: 39-40). As I will explicate in section 4.3, GAP has the potential to function as such an intermediate conceptual tool (Figure 4.7 (iii)).

4.2.2 Knotworking and expansive learning

4.2.2.1 Knotworking

The concept of 'knotworking' allows the emergence of networked activity systems, and entails the construction of constantly changing combinations of people and artefacts over lengthy trajectories of time and widely distributed in space (Engeström, 1999a: 345; Oswald & Perold, 2011: 34). As such, knotworking shifts the unit of analysis from the activity system as a whole (second generation AT) towards the 'unstable knots' that exist between activity systems arranged around a PSO (third generation AT). In writing on the changing nature of urban life in four African cities, Simone (2004a: 15) states that he has "chosen to focus on the provisional itself", immersing himself in various settings under whatever conditions and rubrics possible. Knotworking offers a rubric for engaging with 'in[formal]ity', enabling architectural professionals to "work with the change that results from the constant shifts in human interactions, relationships, and settings" (Kaplan, 1999: 19). In the context of informal settlements, these shifts have brought about spatial practices that are sustained by highly provisional relationships and interactions (Pieterse, 2013b: 13). Knotworking refers to the "rapidly pulsating, distributed, and partially improvised orchestration of collaborative performance between otherwise loosely connected actors and activity systems" (Engeström, 2000: 972). In this context, it entails the continual tying together, untying, and retying of otherwise separate strands of activity. As such, knotworking is more than the sum of the separate perspectives of individuals or groups that contribute thereto. Therefore, it is not possible to analyse knotworking based on the premise of activity having "a centre of coordination and control", as no specific individual or group determines the tying and untying of a knot of collaborative work (Engeström, 1999a: 346-347).

In contrast to temporary groups – understood as singular formations created for the purpose of completing a specific task with a clear deadline – knotworking is a longitudinal process during which knots are formed, dissolved, and re-formed as the object of activity is continually co-configured. Knotworking has no clear deadline or fixed endpoint, and requires rapid negotiation and improvisation with constantly changing configurations of partners (Engeström, 1999a: 973). However, knotworking has the potential to support system innovations that result from the interaction of multiple types of individuals and groups that operate at different levels within (or

outside of) a particular socio-technical regime. It also has the potential to foster innovation and learning at the niche level (Geels & Schot, 2007: 400; Lawhon & Murphy, 2011: 357). The notion of 'conjoint agency' implicit in knotworking enables new perspectives on the community, rules, and division of labour of an activity system (Daniels, 2004: 185). Furthermore, Engeström (2000: 960) finds that new modes of practice increasingly require negotiated knotworking across boundaries. As such, the scope of architectural practice must be "redefined to encompass the pluralities of agents whose actions dovetail or mesh to express new patterns of interdependent relations" (Gronn, 2000: 325). This is particularly evident in the context of informal settlement upgrading, where a realignment between all stakeholders is required in order for the potential of co-production and collaborative design to be realised (Low, 2013a: 17). As far as knotworking pertains to the study of collaboration, the focus is neither on individual nor collective learning, but on how such learning can be directed and organised in order to develop PSOs (Oswald & Perold, 2011: 34). In the global South, a wide range of

> "… provisional, highly fluid, yet coordinated and collective actions are being generated that run parallel to, yet intersect with, a growing proliferation of decentralised local authorities, small-scale enterprises, community associations, and civil society organisations. These actions are replete with locally generated moral and social economies, compelled, nevertheless, from a more expansive engagement with a broad range of external processes and actors. If African cities do, at some level, work, then I contend that these practices [of knotworking] play a major role in making them work." (Simone, 2004a: 13).

In order to support transitions to sustainable urbanism, architectural professionals are required to collaborate with residents in constructing PSOs that encompass multiple perspectives, interpretations, engagements, and practices. Knotworking enables the relationship-building and co-creation between activity systems that are required to address the complex and interrelated socio-technical challenges that accompany this endeavour (Oswald & Perold, 2011: 35).

4.2.2.2 Expansive learning

The collaborative construction of PSOs enables expansive learning as the activity unfolds (Oswald & Perold, 2011: 35). Expansive learning is an advanced type of learning conceived in parallel with DWR (Sannino, 2011: 590). Engeström (1987: 8) describes expansive learning as an integral part of activity that comprises the "work of both mental and material extension and transformation in time". This historically new type of learning is emerging in various fields of societal and professional practice, and entails the construction and resolution of successively evolving contradictions within networked activity systems (Engeström, 1999c: 12; Arnseth, 2008: 289). Expansive learning follows a stepwise cycle of (i) questioning conventional practice, (ii) analysing its contradictions, (iii) modelling a vision of its ZPD, and (iv) implementing and examining the new model of practice (Engeström, 2000: 960) (Figure 4.8). As a hypothetical learning space, the ZPD creates a bridge between what is known and what needs to be learnt (Hardman & Amory,

2015: 14). The research presented in this dissertation employs GAP (within the framework of DWR) as an intermediate conceptual tool to model a vision of the ZPD for architectural practice, and as such involves the first three steps of the expansive learning cycle. GAP entails the "horizontal widening of collective expertise by means of debating, negotiating, and hybridising different perspectives and conceptualisations" (Engeström, 2000: 960). Thus, in exploring GAP, I am modelling a vision of the learning space that creates a bridge between conventional architectural practice ("what is known") and the informal capacities required to engage with residents in supporting informal settlement upgrading as a transition to sustainable urbanism ("what needs to be learnt"). The study of expansive learning in complex settings (such as informal settlement upgrading interventions) requires a longitudinal intervention approach, premised on three methodological rules: (i) following the PSO of activity in its temporal and socio-spatial trajectory; (ii) giving the PSO a voice by involving residents in dialogues where the PSO is made visible, articulated, and negotiated; and (iii) expanding the PSO by organising intervention sessions and assignments where architectural professionals and residents co-construct new shared models, concepts, and artefacts so as to master the PSO (Engeström, 2009: 327). In the exploration of GAP that is presented in this dissertation, I adhere to these methodological rules by collaborating with residents and local organisations in the course of three live projects that contribute to ongoing informal settlement upgrading interventions. Learning in the context of AT entails the expansion of architectural professionals' social and intellectual involvement with residents and the artefacts they employ in their informal spatial practice, rather than internalising non-contextual information or even developing individual competencies (McMillan, 2009: 45-46). Accordingly, expansive learning is particularly suited to contexts where there is

> "… something to learn that is not stable or not even defined or understood ahead of time. New skills and practices are literally learned as they are being created in response to new challenges. Expansive learning is essentially a collective endeavour … all learning is seen as in some way collaborative and that takes place through a process of inquiry within a social group. Expansive learning thus develops from learning prompted and motivated by constraints and actively and collectively (as a co-creation) develops new patterns of activity." (Oswald & Perold, 2011: 28)

This understanding of learning challenges the notion of architectural practice as being determined by a fixed set of professional competencies. Instead, architectural practice can be understood as an evolving process of expansive learning that requires architectural professionals to employ a much wider range of capacities, including those that Pieterse (2004: 350-352) proposes for 'subversive praxis': code-switching, the ability to adopt a multi-focal perspective, self-reflexivity, and being empirically informed and symbolically attuned[7].

[7] These capacities were discussed in subsection 3.2.4.

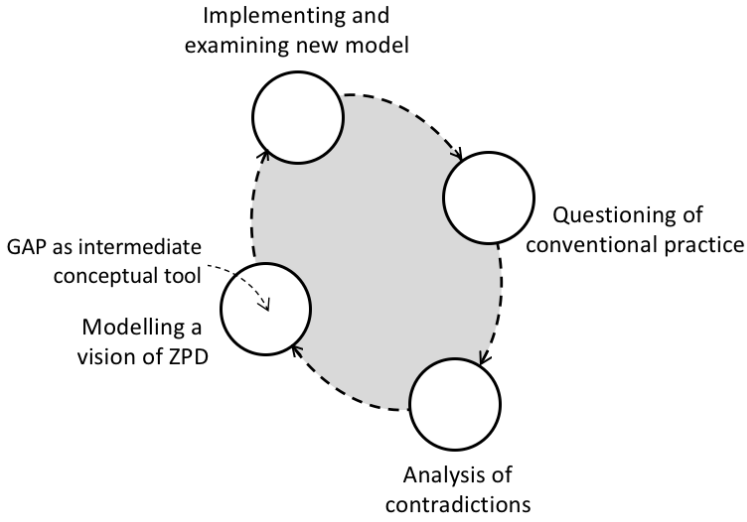

Figure 4.8 A stepwise cycle of expansive learning
Diagram by author, based on Engeström (2000: 960)

4.2.3 Epistemological principles

There are two epistemological principles that underpin phenomenological explorations that employ empirical AT analysis: (i) dual stimulation, and (ii) ascending from the abstract to the concrete. The principle of 'dual stimulation' posits that people who are confronted with problems in their ongoing activity are subject to two stimuli, namely the problem itself, and the artefacts employed to solve the problem. In discussing the dialectical method of 'ascending from the abstract to the concrete', I will suggest that the notion of 'in[formal]ity' enables an exploration of the different manifestations of GAP in the three live projects that inform the research reported in this dissertation.

4.2.3.1 Dual stimulation

The principle of 'dual stimulation' is concerned with the development of human functioning, rather than with exploring functions that have already developed. Research participants are confronted with a problem that lies beyond their present capabilities, and are then provided with neutral artefacts (or the means to construct new artefacts) that they can use to address the problem (Vygotsky, 1978: 74; Daniels, 2011: 361). In the research presented in this dissertation, dual stimulation draws attention to the manner in which architectural professionals, during upgrading interventions, address problems that emerge with artefacts embedded in conventional architectural practice (e.g. cardboard models and technical drawing), as well as with existing artefacts or those co-constructed together with residents and local organisations (e.g.

situated knowledge and user scenarios). In employing and constructing artefacts to address problems, new understandings of such problems are also developed. Dual stimulation has three main characteristics: (i) a given, self-, or co-constructed conflictual problem (first stimulus); (ii) an existing or co-constructed auxiliary artefact (second stimulus); and (iii) the determining of one's own actions so as to develop a new understanding of the problem. As such, dual stimulation underlies the "genesis of will" and enables architectural professionals to "intentionally break out of a conflicting situation and … solve difficult problems" (Sannino, 2011: 584-585, 592). Dual stimulation is further related to the concept of 'formative interventions'. Within the framework of DWR, these interventions aim to generate intermediate conceptual tools and capacities that can be employed in different contexts to generate locally appropriate solutions. Formative interventions are radically different from linear interventions, where the content and goal of the intervention is known beforehand. Instead, formative interventions entail the negotiated construction of novel solutions or concepts that cannot be determined before the intervention has begun (Engeström, 2009: 321-322). In the research reported in this dissertation, the three live projects serve as formative interventions that enable an exploration of GAP so as to model a vision of the ZPD of architectural practice in the context of informal settlement upgrading. As indicated in Figure 4.9, the live projects construct a bridge between what is known and what needs to be learnt so as to foster an emergent mode of architectural practice.

4.2.3.2 Ascending from the abstract to the concrete

Expansive learning entails a stepwise process of ascending from the abstract to the concrete. This process comprises four stages: (i) practical transformation, change, and experimentation within a problematic situation; (ii) the identification and modelling of a 'germ cell' behind the problematic situation (initial abstraction); (iii) testing the 'germ cell' in its different material manifestations and possible variations; and (iv) developing a theoretically mastered solution to the initial problematic situation (Davydov, 1984: 25; Engeström, 2009: 314; Sannino, 2011: 593) (Figure 4.10). The 'germ cell' enables the representation of a complex system, such as the notion of 'in[formal]ity' that is embedded in the networked activity systems of local government and residents, in a simple and pure abstract form (Sannino, 2011: 588). As such, the 'germ cell' is an ever-present and common part of the whole and retains all the fundamental characteristics and relationships of the entire system in its theoretical abstraction. Once an abstract 'germ cell' has been constructed by transforming an initial problem situation by means of experimentation and analysis, it can then be utilised in the construction of increasingly complex extensions and applications, so as to lead to a "rich, continuously expanding living system, the conceptually mastered concrete" (Engeström, 2009: 327). In the research presented in this dissertation, the problem situation is informal settlement upgrading, the notion of 'in[formal]ity' is a 'germ cell' that becomes manifest as GAP (i.e. in material form) in the three informal settlement upgrading interventions being explored, and the informal capacities employed by architectural professionals constitute the theoretically mastered solution to the failure of the architectural profession to support and engage with resident-driven initiatives such as reblocking and *in situ* upgrading.

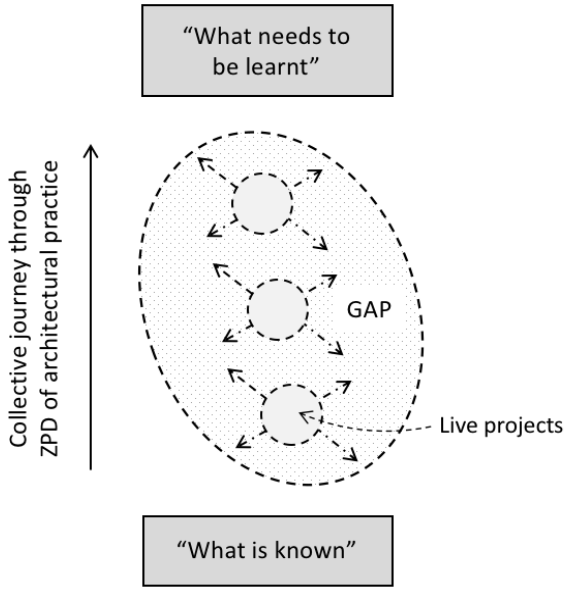

Figure 4.9 Employing formative interventions and GAP to model a vision of the ZPD Diagram by author, based on Engeström (2000: 960; 2009: 322) and Hardman & Amory (2015: 14)

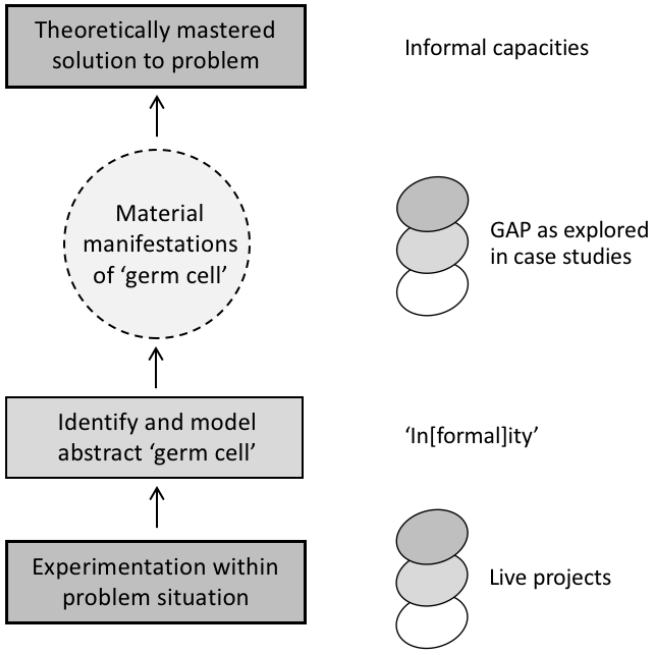

Figure 4.10 Expansive learning as a stepwise process of ascending from the abstract to the concrete. Diagram by author, based on Engeström (2009: 314) and Sannino (2011: 593)

4.3 Grounded architectural practice: An intermediate conceptual tool

This section concludes the theoretical and analytical framework and addresses the second aim of the research, namely to explore niche-level transitions to sustainable urbanism in Cape Town. Expressed in terms of the MLP, the research presented in this dissertation entails an exploration of an emergent mode of architectural practice in three live project case studies (presented in the following chapter) as a niche-level innovation. The practice of the local organisations in which such architectural practice is embedded constitutes a protected space where "small networks of actors can learn about and develop new and novel technologies and practices" (Swilling et al., 2015: 6). As such, GAP emanates from the niche level and disrupts the shared understanding of priorities, appropriate actions, and rules that structures the regime of conventional architectural practice. In doing so, following Trede (2012: 161), this exploration of the niche level aims to elucidate the non-conscious learning and tacit knowledge that exists within GAP, thereby articulating and sharing the competencies and capacities that enable such practice. Employing the framework provided by DWR, the exploration commences by positioning GAP as an intermediate 'empty stage' between the theoretically structured activity model and the experiential model of architectural practice in the context of informal settlement upgrading (Figure 4.11).

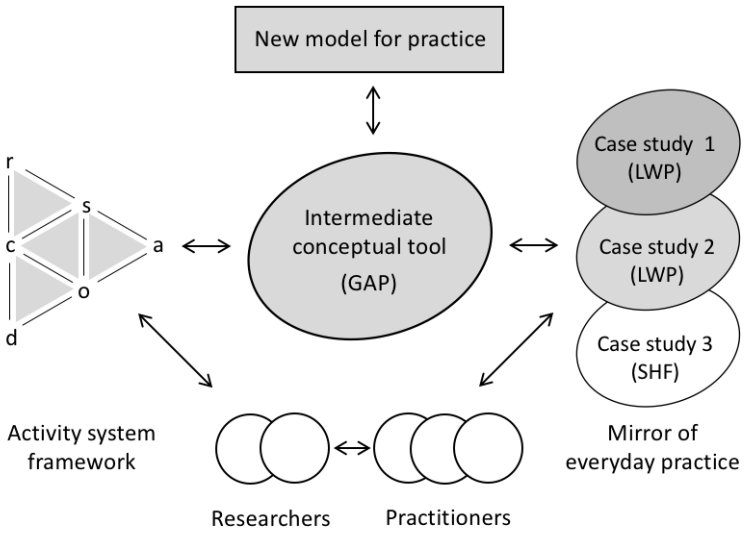

Figure 4.11 DWR as employed in the research reported on in this dissertation
Adapted from Engeström (1991a: 80)

The exploration draws on the live project case studies presented in the following chapter, and "leads to the threshold of the future" (Engeström, 1991a: 79) by informing the mapping and comparative analysis of GAP as manifested in the three case studies. The comparative analysis (reported on in section 6.1) addresses the third aim of the research (i.e. to explore the impact of the niche level on the regime level) by identifying patterns that emerge in relation to the nature of architectural practice as an activity, as well as the competencies and capacities employed by architectural professionals in their interaction with residents and local government in the three case studies. The subsections that follow are aligned with the two ideas that guide and structure the research presented in this dissertation: the notion of 'in[formal]ity' and the phenomenon of GAP as unit of analysis.

4.3.1 Transitions to sustainable urbanism

The notion of 'in[formal]ity' as a dialectic whole informs the exploration of an emergent mode of architectural practice in the three case studies. This notion constitutes a departure from the binary between "apocalyptical views" and "irrepressible optimism" w.r.t. informal settlements, and requires a balance between calling for their eradication and prevention, on the one hand, and perceiving them as the solution to urbanisation, on the other (Cirolia et al., 2016: 17). In South Africa, this balance takes the form of an incremental continuum between formal urban development and informal spatial practice, between housing delivered by government and dwellings constructed by residents themselves (Bolnick & Bradlow, 2010: 35). In order to focus attention on issues relating to justice, power, complexity, and provisionality, this continuum requires of architectural professionals to develop a more political and critical interpretation of the "co-constitutive relationship between the informal practices of the urban poor and urban governance arrangements" (Cirolia et al., 2016: 5). Such an interpretation ought to be critical of any rationality that supports reckless interventions into the lives and livelihoods of residents, failing to appreciate the delicate networks and strategies embedded in their spatial practice. Instead, a conceptual inversion – viewing the urban from the perspective of informal settlement residents – is required to foreground the "practices, dynamics, [and] potentialities that reside beyond the state's reach and understanding" (Pieterse, 2008: 109). In doing so, this conceptual inversion will enable a "deeper appreciation of [the] cultural identities and dynamics that play out in the lived realities of daily life and symbolic manifestations", so informing more appropriate upgrading interventions (ibid.).

Furthermore, architectural professionals are called upon to explore the interrelation of informal spatial practice and the formal system within which it exists, as well as the shortcomings of which it responds to (Combrinck et al., 2017b: 34). This entails a dialectic relationship between top-down planning, informed by formal laws and structures, and bottom-up, self-organising collectivism that constitutes a differentiated process embodying varying degrees of power and exclusion (Hamdi, 2004: xxi; Roy, 2005: 148). The notion of 'dialectic urbanism' (discussed in subsection 4.1.1) provides three Lefebvrian perspectives with which to consider the relationship between top-down planning and bottom-up, self-organising collectivism. Everyday life, the levels of social totality, and the production of space all point to the contradictions that emerge when the formal and the informal interact. These perspectives, together with those of counter-conduct and self-organisation, shed light on how the notion of 'in[formal]ity' is embedded in the spatial practice of both residents and local government. This notion does away with the hierarchical, divergent, and oppositional relationship between the formal and the informal, and replaces it with a complementary relationship that does not require the subordination of one to the other. In doing so, the separation between formal and informal is replaced by

> "… mutual co-construction, co-evolution, continuous dialogue, belonging, participation and the like, all underscoring relatedness and interconnectedness, blending and meshing – the 'coming together' of individuals … that transcends their separation" (Stetsenko, 2008: 477).

Such a relationship between local government and residents meets the four essential conditions for achieving sustainable development that were presented in subsection 1.1.3: (i) improving quality of life and well-being; (ii) meeting the needs of both present and future generations; (iii) justice and equity w.r.t. recognition, process, procedure, and outcome; and (iv) living within ecosystem limits (Agyeman, 2005: 92). In fostering the complementary relationship between the residents and local government, GAP engages with informal spatial practice and requires of architectural professionals to engage constructively with conflict and dissension through participatory and dialectic processes (Dodd, 2011: 8-9). The case studies presented in the next chapter provide empirical evidence of such constructive engagement, which is mapped according to the activity system framework provided by AT.

4.3.2 Constructing a partially shared object

In the research presented in this dissertation, the activity system framework is adapted to incorporate the notion of 'in[formal]ity'. This is achieved by mapping the actions of residents and local government during informal settlement upgrading interventions onto two interacting and networked activity systems with a PSO. As discussed in subsection 4.2.1, GAP emerges from the boundary zone between these two networked activity systems. However, from the perspective of architectural practice – "a distinct, superior, specialised, structured activity" (Lefebvre, 2002[1961]: 210) – fully comprehending informal spatial practice remains challenging, despite the fact that architectural practice (as a non-everyday activity) derives from everyday activity. As a means of recognising this challenge, I have derived the term 'GAP' from the following observations regarding spatial practice:

> "… being grounded in reality ... overcoming existing relations – separations – between abstract processes and concrete life" (Goonewardena, 2008: 118), and
>
> "… both processes of conceptual deconstruction and reconstruction build from grounded engagement with empirical realities and political imperatives" (Oldfield, Parnell, and Mabin, 2004: 295).

As a form of grounded engagement, GAP transcends professional knowledge and expertise, and requires architectural professionals to be conscious of both from whom and with whom they learn so as to produce "knowledge that can travel across the borders of academia, NGOs, [and] people's movements" (Oldfield, 2014: 2073-2075). In support of such knowledge production, expansive learning offers a framework to explore the competencies and capacities employed in and developed through GAP. This exploration requires the mapping of the actions of residents, local government, and architectural professionals as they engage in informal settlement upgrading interventions (as previously indicated in Figure 4.7). Such interventions are collective efforts that require the participation of all stakeholders; in informal settlements in particular there are many actors, interests, priorities, and expectations at play. Architectural professionals must negotiate these complexities so as to allow for the emergence of collectively defined desired outcomes (Isandla Institute, 2014a: 1; Aravena, 2015). As such, it is necessary to construct a PSO around which the activity systems of residents and local government can be arranged. GAP then entails participation in the activities of both residents and local government as they aim to transform their PSO, and to mediate between the two activity systems in order to ensure the continued alignment of both the PSO and the desired outcomes as the upgrading intervention unfolds. Within this analytical framework, GAP is understood as an iterative, integrated, contradiction-driven process of knotworking that is rooted and contextualised in terms of the activity systems of residents and local government.

4.3.3 Conclusion

As discussed in the introduction to this section, GAP is positioned as an intermediate 'empty stage' between the theoretically structured activity model and the experiential model of architectural practice in the context of informal settlement upgrading. This stage will be used to "capture emerging ideas and representations" (Engeström, 1991a: 80) as the empirical part of the research unfolds in the following two chapters. These ideas and representations derive from the AT mapping of the contradiction-driven activity during the upgrading interventions explored in the case studies. The activity system framework as adapted to the notion of 'in[formal]ity' is employed to map the dominant activity system, contradictions, and knotworking that emerge in the course of each upgrading intervention. Subsequent to this mapping, a comparative analysis of the empirical findings will address the third aim of the research, which is to explore the impact of GAP as an emergent mode of architectural practice at niche level on the regime of conventional architectural practice.

Chapter 5

Case studies

Reblocking, neighbourhood centre, and process house

Chapter 5 Case studies
Reblocking, neighbourhood centre, and process house

In conducting an exploration of GAP in transitions to sustainable urbanism in Cape Town, I have collected primary data by engaging with residents through three live projects undertaken in collaboration with local organisations. My participation in these live projects has enabled me to engage with concrete data on the history of the respective upgrading interventions, as well as with ongoing everyday practice. In this chapter I will introduce the three informal settlement upgrading interventions that serve as case studies, after which each case study will be discussed individually. In the next chapter, these discussions will inform a comparative analysis of the empirical findings derived from the case studies, with reference to the activity system mapping in particular, as the latter assists in identifying patterns that relate to the emergent mode of architectural practice that is being explored in the research reported on in this dissertation.

5.1 Introduction

The three informal settlement upgrading interventions that were identified to serve as case studies are situated in close proximity to one another in Lwazi Park (LWP), Lotus Park (LTP), and Sweet Home Farm (SHF) respectively (Figure 5.1). These case studies represent a range of architectural practices in terms of (i) the size and the organisational culture of the organisations within which it was embedded (VPUU being the largest, and UBU the smallest); (ii) the role of architectural practice in their intervention strategy, as well as and the complexity and nature of the strategy; and (iii) the type of architectural project, i.e. the design of dwelling layouts, the design and construction of a spatial intervention, and the adaptation of an existing typology to a different function. The upgrading interventions that the live projects contribute to were also selected so as to ensure diversity: the further upgrading of a settlement that had already been reblocked (LWP), the consolidation of a public node so as to support a range of social programmes (LTP), and the development of a self-build dwelling typology to enable residents to upgrade their dwellings themselves (SHF).

The three live projects were undertaken between 2015 and 2017, and the case studies are presented in chronological order in the sections that follow. Each of these sections consists of two subsections: a description of the background to and selection rationale for the case study, followed by a descriptive narrative and activity system mapping of the history of the upgrading intervention as well as its ongoing everyday practice during the live project. In the descriptive narrative of each case study, four instances of knotworking are explored, with each instance involving a number of contradictions and knots (numbered individually as shown in Figure 5.2).

Figure 5.1 The three case study locations, with inset indicating their position in relation to the Cape Town CBD. Photographs: Google Earth, 2017

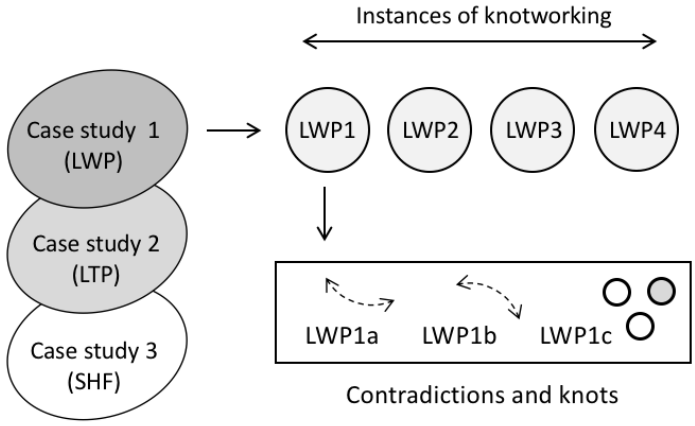

Figure 5.2 Four instances of knotworking are explored in each case study (e.g. LWP1), with each instance involving a number of contradictions (e.g. LWP1a and LWP1b) and knots (e.g. LWP1c). Diagram by author

Prompting each such instance are accumulated structural tensions (within and between the activity systems of residents and local government) that become manifest as a number of contradictions, temporarily interrupting the activity. These contradictions, as well as the activity system elements that form the 'unstable knots' that lead to the their resolution, are mapped onto the activity system framework (as adapted to the notion of 'in[formal]ity', indicated previously in Figure 3.13). This mapping is reflected in the figures that accompany each knot that relates to GAP in the descriptive narrative of the respective case studies. Furthermore, the dominant activity system (that of residents, local government, or both in the case of a balanced activity system) at the time of each contradiction becoming manifest or knot being tied, is also indicated so as to draw attention to the shifting power relations as the upgrading intervention unfolds.

5.2 Lwazi Park reblocking and dwelling typologies

5.2.1 Background and selection rationale

The live project at Lwazi Park was undertaken in 2015 in collaboration with CORC and entailed the collaborative development of new dwelling typologies in order to support an UISP project application for 38 households in Lwazi Park, Gugulethu. This was the third live project that Design Build Research Studio (DBRS) and CORC had undertaken together and followed on from a reblocking co-design process at Vygeskraal and a hostel upgrading design process in Manenberg (both these settlements being in close proximity to the case study locations of this research).

5.2.1.1 Community Organisation Resource Centre (CORC)

CORC was established as an NGO in 2004, and has been supporting the Coalition of the Urban Poor (CUP) – a wide range of community-based organisations (CBOs) – since its establishment in 2006, by creating platforms for learning exchanges, providing technical support, and through documentation. CORC also provides support to the Informal Settlement Network (ISN) which was established in 2008 (Fieuw, 2013: 69). Both ISN and CORC are local affiliates of Shack / Slum Dwellers International (SDI), the former as a community network together with FEDUP, and the latter as a support organisation together with the uTshani Fund. As a bottom-up agglomeration of settlement-level organisations, ISN mobilises residents to engage local government on issues of security of tenure, improved service delivery and incremental informal settlement upgrading. FEDUP is a national organisation of urban and rural poor women that focuses on daily savings, data collection, pragmatic partnerships with local government, resident-driven housing development, and informal settlement upgrading. CORC focuses on social and technical processes: developing strategies for inclusive urbanism by facilitating engagements with formal

actors, supporting the development of savings, data collection, and learning exchanges, and resident-driven project preparation and implementation. The uTshani Fund is a formal bridging finance institution that manages urban poor funds and provides loans for resident-driven house construction, land acquisition, and incremental informal settlement upgrading (SA SDI Alliance & CORC, 2015: 6). CORC has adopted four methods (referred to as 'rituals') of SDI in their work (Winckler, 2013: 219):

- Establishing savings associations among residents, in order to finance incremental settlement upgrading.
- Conducting resident-driven surveys and enumerations of informal settlements so as to accurately map the location, size, and layout of dwellings, as well as collecting qualitative information.
- Implementing reblocking projects, which entails the reconfiguration and repositioning of dwellings according to a self-determined spatial framework aimed at improved space utilisation, allowing for service infrastructure provision and a safer environment.
- Facilitating both horizontal and vertical learning (also referred as mutual learning) between groups of residents, and between residents and local government.

Further to the uTshani Fund, the SA SDI Alliance has also established the Community Upgrading Finance Facility (CUFF). CUFF provides an alternative to government subsidies by providing seed capital for informal settlement upgrading projects that are prioritised by residents and provides funds to member organisations of FEDUP and ISN that are able to contribute 20 percent to the total cost of their project, so as to ensure local ownership and co-production (SA SDI Alliance & CORC, 2015: 52). CUFF's board consists of 60 percent informal settlement residents and 40 percent CORC technical staff and makes the final decision regarding the allocation of funds. CUFF aims to support precedent-setting projects that enable partnership formation between residents and local government, including small-scale drainage, water, and sanitation reticulation projects, the construction of public amenities (e.g. early childhood development (ECD) facilities and community centres), as well as reblocking projects (Fieuw, 2013: 69). In Cape Town, CUFF is complemented by the City Fund, and facilitates a transitional step between waiting on local government to deliver service infrastructure and realising full service provision. This fund allows residents to implement creative and incremental solutions towards the upgrading of their settlements, as well as respond to the unforeseen needs and emergencies that informal settlements are prone to (SA SDI Alliance & CORC, 2015: 52).

5.2.1.2 Lwazi Park

Based on the success of a reblocking project in the Joe Slovo informal settlement in Milnerton after 500 dwellings were destroyed by a fire in 2009, the COCT decided to partner with ISN and CORC in order to conduct 12 reblocking pilot projects. One of these was to be in Lwazi Park, a

small informal settlement adjacent to the Lotus River canal between Gugulethu and Barcelona informal settlement (Fieuw, 2013: 73). This low-lying area has many canals that were built during the 1960s when the apartheid government forcibly moved non-whites from the city centre to new townships on what was then the urban periphery. These canals are hopelessly inadequate, severely polluted, and prone to flooding during winter (SA SDI Alliance, 2012: n.p.).

During the mid-1990s, the first inhabitants of Lwazi Park built informal dwellings along the western edge of the Lotus River canal, adjacent to the Lwazi Park Primary School. By 2001 their settlement stretched from Klipfontein Road in the south up to a triangular portion of land where the canal meets the eastern edge of Gugulethu. Barcelona, on the eastern side of the canal, developed at the same time as Lwazi Park after the repeal of apartheid era urban influx control legislation. By 2005, the triangular portion of land on the northern end of Lwazi Park was cleared by the COCT and hard core fill was used to establish a higher ground level, presumably to avoid flooding. By 2010, Lwazi Park was home to 38 households, most of which moved there from Barcelona due to overcrowding (Hendler & Meke, 2015) (Figure 5.3).

Figure 5.3 The development of Lwazi Park between 2001 and 2010
Photographs: Google Earth, 2017

5.2.1.3 Selection rationale

The SDI rituals referred to above are being appropriated by residents to legitimise their right to the city, with this task often requiring support from architectural professionals (Winckler, 2013: 219). As such, informal settlement upgrading transcends the mere provision of services, and is also concerned with realising citizenship and spatial equality. This entails renewed relations between residents and local government, based on a strategy of co-production where residents secure political influence, build their own capacities and skills, and access central decision-making processes that determine resource allocation. Establishing such a balance of micro-level interventions and practices with macro-level governmental structures and policy requires the "skilful building of institutions [and practices] that can navigate the complexities of informal settlement upgrading" (Fieuw, 2013: 66-69). Lwazi Park has become a testing ground for such partnerships between different departments in the COCT, professional consultants, NGOs, and informal settlement leadership structures (CORC, Lwazi Park Community & SA SDI Alliance, 2011: n.p.). With this shift from opposition to collaboration, CORC strives to influence resource allocation in local government, and to draw attention to the capacities of residents as they plan, budget, procure, and implement their own projects. The draft development plans produced by residents enable effective negotiation with local government authorities (Fieuw, 2013: 69). CORC has also provided input into the COCT's Built Environment Performance Plan, and has advocated for a more prominent role for residents in upgrading projects. They have furthermore signed a memorandum of understanding with the COCT that entailed preparation for eight reblocking-based informal settlement upgrading projects (SA SDI Alliance & CORC, 2015: 40, 53). During 2012, an architectural technologist at CORC (OJ) who had recently graduated from CPUT did a presentation of CORC's work at DBRS[1]. DBRS has since developed a good relationship with CORC, which began with the co-design of a reblocking layout for the Vygeskraal informal settlement community, less than five kilometres from Lwazi Park, during 2013.

5.2.2 Descriptive narrative and mapping

5.2.2.1 Reblocking

During January 2011, the COCT Roads and Storm Water Department initiated a project to widen the Lotus River canal, which necessitated the relocation of the residents of Lwazi Park. An external planning consultant (BC, see Table 5.1) employed by the COCT prepared a conventional, uniform settlement layout on the triangular portion of land to the north of the existing settlement, so that residents would not have be moved to a TRA on the urban periphery (Faure, 2016).

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1 As discussed in subsection 1.4.2.1, my colleague Hermie Delport and I undertake live projects at DBRS, a research unit in the Department of Architectural Technology and Interior Design at CPUT.

Table 5.1 Role players in the Lwazi Park case study
Table by author

Role players in the Lwazi Park case study	
Initials	Role
AK	Architect, CORC
BC	External planning consultant
DF	Manager, COCT UISD
OJ	Architectural technologist, CORC
SM	Town and regional planner, CORC
WQ	Resident leader, LWP

The layout was based on standardised erf sizes (seven by eight metres) and allowed for eight shared free-standing toilet enclosures and two water points as well as ZAR 1 000 per dwelling (CORC et al., 2011: n.p.). However, only 26 dwellings were included in this conventional layout which was subsequently rejected by the resident leadership of Lwazi Park as it would require 12 households to be moved elsewhere (ISN, Lwazi Park Community Leadership & CORC, 2011: 5). This resulted in two contradictions: a secondary one between a rule (no residents to be moved to peripheral TRA) and an artefact (conventional settlement layout) of the local government activity system (LWP1a), and a quaternary one between a local government artefact (conventional settlement layout) and a residents' rule (all households to be accommodated) (LWP1b)[2]. To facilitate ease of identification in both the text and figures from here on forward, contradictions are underlined and **knotworking elements** are indicated in bold font. Contradiction types are indicated as such: primary (1e), secondary (2e), quaternary (4e).

If BC had spent more time in liaison with the resident leadership regarding the design of the proposed settlement layout, both contradictions might have been avoided. The UISD then called on CORC to assist with the Lwazi Park relocation, and the resident leadership indicated that they were in agreement that CORC could assist them with the planning and negotiations. During the subsequent engagement, it became evident that although BC had liaised with the resident leadership during the design of the proposed settlement layout, the latter group had not been afforded the opportunity to provide input into the design (CORC et al., 2011: n.p.). CORC facilitated an introductory meeting between BC, the manager of the UISD (DF), and the resident

[2] Each contradiction and knot is numbered and mapped individually. In the interest of brevity, only the mapping of knots that pertain to GAP are included in the text. These knots were identified by cross-referencing the artefacts, rules, and division of labour with the SACAP competencies (refer back to Table 3.1). All contradictions and non-GAP knots are however included in the mapping provided in Appendix B.

leadership in late January 2011, during which the proposed settlement layout was discussed. As the resident leadership perceived the relocation as an opportunity to express their aspirations for the upgrading of the settlement, their concerns extended beyond the fact that not all households were accommodated in the proposed layout (CORC et al., 2011: n.p.). As a result, the COCT provided the resident leadership with the opportunity to propose an alternative settlement layout and allowed more time so as to accommodate a participatory co-design process facilitated by CORC (**local government rules**) (LWP1c, see Figure 5.4). This knotworking allowed the resolution of both contradictions by means of an architect at CORC (AK) assisting the resident leadership with the development of an alternative settlement layout (**residents subject, artefact, division of labour,** and **rules**). The latter layout also facilitated the expansion of the PSO from the relocation of residents alone to including their aspirations for the upgrading of the settlement.

Notwithstanding the above, the timelines for the canal widening project were predetermined and BC exercised pressure on AK to expedite this process. The process included resident-driven mapping (the measuring of plots and dwellings) (Figure 5.5), enumeration (a socio-demographic survey of every household), and the co-design of an alternative settlement layout (ISN et al., 2011: 5). Many informal discussions occurred during this process, and residents were able to express their concerns around the settlement layout proposed by BC: (i) wide streets would

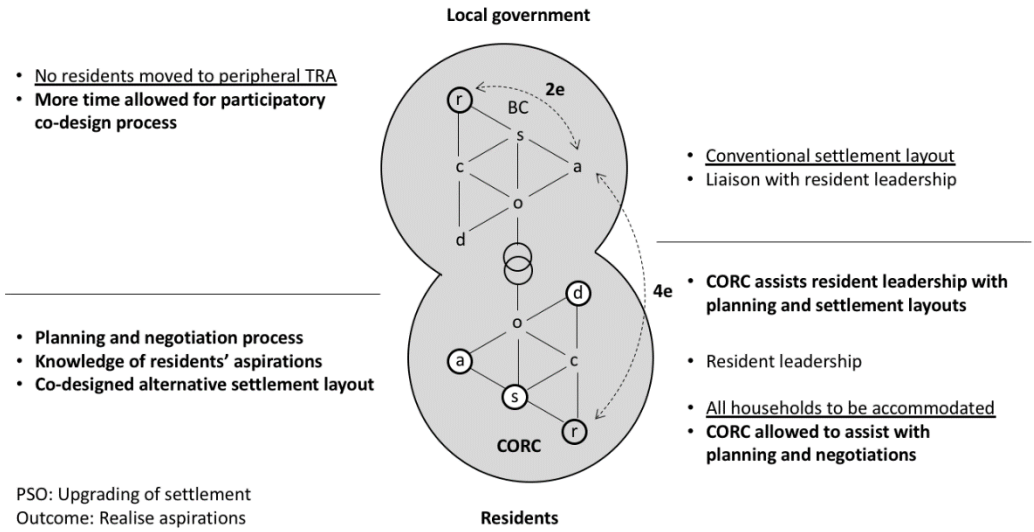

Figure 5.4 Knot LWP1c: COCT allows more time in order for CORC to assist the resident leadership in preparing an alternative settlement layout that accommodates all households. Diagram by author[3]

[3] AT mapping as employed in the research reported on in this dissertation, was introduced in section 4.2 (see Figures 4.5 and 4.7(iii)), and a legend is provided in appendix B. The annotations on either side of the diagram relates to the activity system element that it is aligned with vertically.

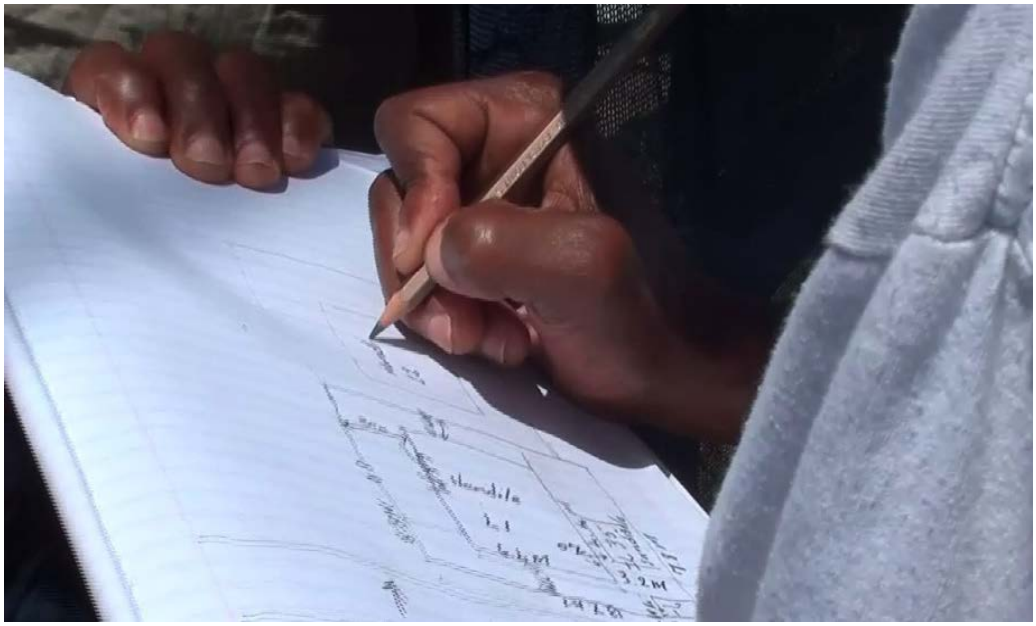

Figure 5.5 Resident-driven mapping entails the measuring of plots and dwellings
Photograph: CORC, 2015

be a thoroughfare to Barcelona; (ii) insufficient perimeter security, and (iii) a lack of space for communal services such as washing and laundry areas (CORC et al., 2011: n.p.). With CORC's assistance, the resident leadership (headed by WQ) prepared a report that described their living conditions. This report enabled them to engage the COCT constructively w.r.t. their needs and concerns during a meeting with DF and officials from the UISD in early February 2011 (Faure, 2016; Kumar, 2016). The co-designed settlement layout organised the relocated dwellings along the perimeter of the triangular portion of land (Figure 5.6), and allowed adequate space for courtyards, shared toilets, and washing areas, as well as a central square, play area and future community hall or ECD facility (CORC et al., 2011: n.p.). Instead of a grid layout based on standardised erf sizes, the layout took into account site contours and existing pathways, with plots of varying sizes to cater for households with different needs. The shared toilets were placed in the centre of the square to discourage vandalism (ISN et al., 2011: 5). A week later, the co-designed layout was presented to DF and BC.

While both of them recognised the relevance and quality of the layout, BC warned that substantial deviations from his initial layout would result in delays to the canal widening project, as the services infrastructure layout would have to be redesigned. This resulted in two contradictions: a secondary one between a local government artefact (services infrastructure layout) and the PSO (co-designed alternative settlement layout) (LWP2a), and a primary one within the local government rules (more time allowed for co-design process vs. fixed timeline of canal widening project) (LWP2b). During the following days, knotworking by AK, WQ, and DF resolved these contradictions. AK reviewed the co-designed layout to reduce deviations from the

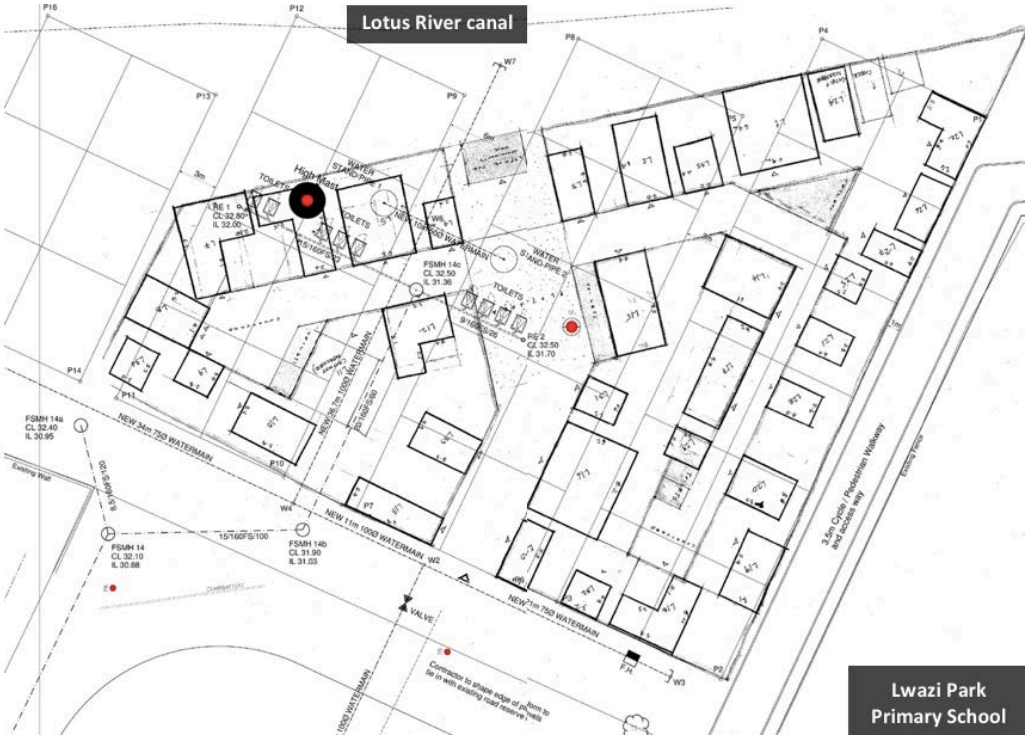

Figure 5.6 Co-designed settlement layout superimposed on the conventional layout, with dwellings arranged around the perimeter of the triangular site
Drawing: CORC, 2015

services infrastructure layout (**residents' subject** and **division of labour**), and after consensus was reached within the resident leadership about the layout, it was shared with BC again. In a subsequent meeting to discuss further changes, WQ conveyed a warning that there was a likelihood of protest action if the co-designed layout was not implemented (**residents' subject** and **artefact**) (LWP2c, see Figure 5.7) (Kumar, 2016). After this, DF played a pivotal role in mediating between AK and the various COCT departments that had to provide input into the settlement layout w.r.t. services infrastructure and public safety, so as to ensure that the co-designed layout could be implemented (**local government subject** and **division of labour**) (LWP2d). By the end of March 2011, the co-designed layout had been approved with minimal changes to the resident leadership's original intent (CORC et al., 2011: n.p.)

Within a week of the co-designed layout being approved, the residents moved to the relocation site with the assistance of a truck provided by the COCT. The UISD had provided an emergency housing kit for each household, consisting of some corrugated sheeting and lengths of timber. BC refused to mark out the co-designed layout on the relocation site due to an ongoing conflict regarding the layout of services infrastructure, which resulted in two contradictions involving the local government division of labour (BC refuses to mark out layout): a quaternary one with

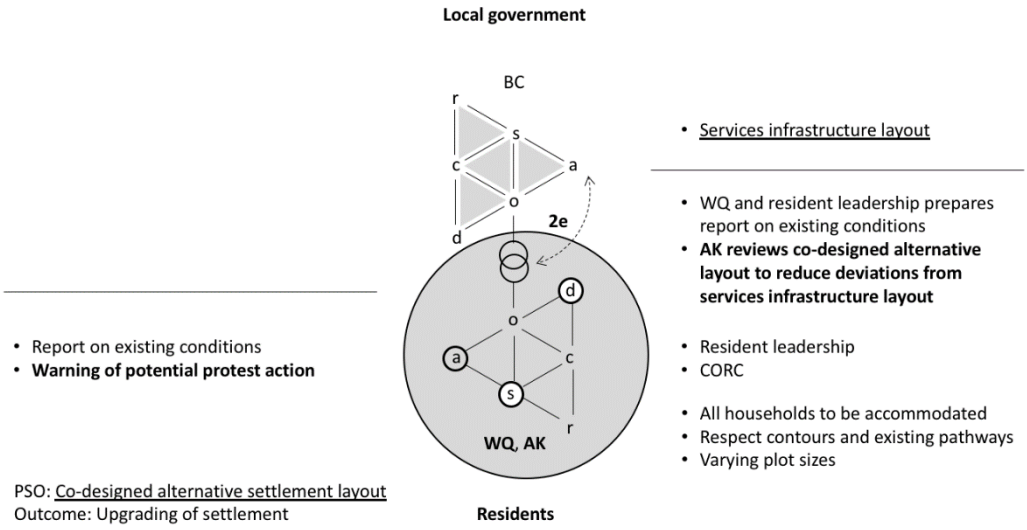

Figure 5.7 Knot LWP2c: AK reviews the co-designed layout to reduce deviations from the services infrastructure layout, and WQ warns of potential protest action if the co-designed layout is not implemented. Diagram by author

a residents' rule (co-designed layout to be implemented) (LWP3a), and a secondary one with the PSO (move residents to relocation site) (LWP3b). These two contradictions were resolved by two CORC employees marking out the co-designed layout on the relocation site and WQ facilitating the allocation of plots (**residents' subject, community,** and **division of labour**) (LWP3c) (Figure 5.8). The allocation of plots did not proceed without problems and some dwellings that were erected on the site earmarked for the square had to be relocated again. The ongoing conflict regarding the services infrastructure layout resulted in electricity poles being installed in the middle of roadways while the relocation was taking place. At the time that AK confronted DF and BC about this, it was too late to rectify the situation.

Once the relocation was complete, BC halted the installation of services infrastructure and commenced with the canal widening project. This resulted in the relocated residents not having access to water or electricity for some weeks after the relocation (Kumar, 2016). BC's decision to halt the services infrastructure installation was in response to a primary contradiction within the local government division of labour: he had to install the services infrastructure, but he also had to commence with the canal widening project that had been delayed by the COCT's decision to accommodate the participatory co-design process facilitated by CORC. The decision to halt the services infrastructure installation resulted in another primary contradiction, this time in terms of the desired outcome of the PSO: the residents' aspiration was settlement upgrading (i.e. to have the services infrastructure installation completed), while the COCT was concerned with the commencement of the canal widening project. Both these primary contradictions were resolved some weeks after the relocation, when BC eventually managed to complete the services infrastructure installation (**local government subject** and **division of labour**) (LWP3f).

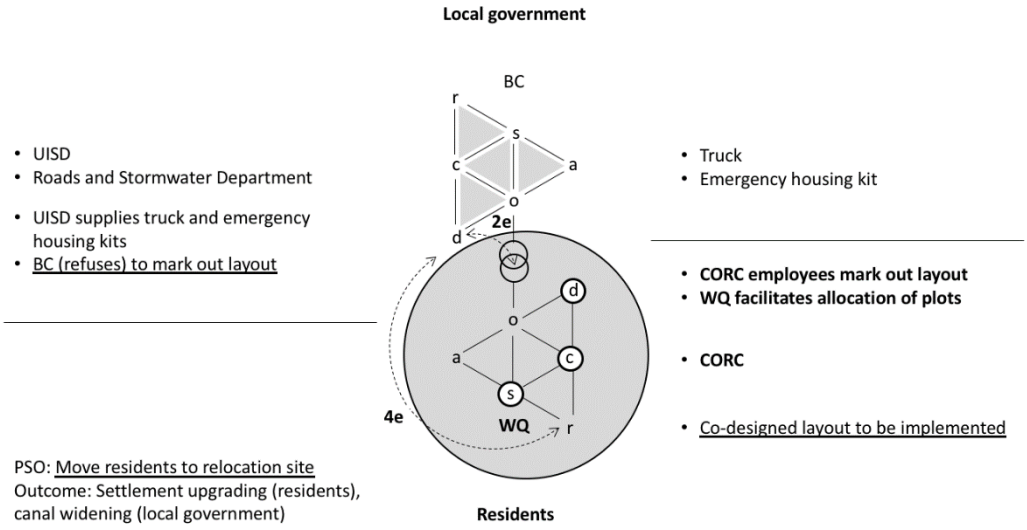

Figure 5.8 Knot LWP3c: Two CORC employees mark out the co-designed layout on the relocation site and WQ facilitates the allocation of plots
Diagram by author

Soon after the relocation, in May 2011, 16 households applied for funding from CUFF to upgrade their dwellings, with each household contributing 20 percent (ZAR 600) of the cost of the upgraded dwelling. However, these dwellings were still only 15 square metres in size. During September 2011, officials from the National Department of Human Settlements visited Lwazi Park, and together with the resident leadership they discussed the issue of tenure security and further incremental upgrading of the settlement (CORC et al., 2011: n.p.).

5.2.2.2 Dwelling typologies

By 2015, the resident leadership of Lwazi Park was keen to explore options for the further *in situ* upgrading of their settlement after the reblocking that had taken place in 2011. However, in order to submit an UISP application to the UISD they required a revised settlement layout and dwelling typologies. The resident leadership did not have adequate capacity to prepare the required documentation, resulting in a secondary contradiction between the PSO (application for UISP project) and a local government rule (UISP application requires revised settlement layout and housing typologies) (LWP4a). In April 2015, this contradiction was resolved when, together with CORC and resident volunteers, DBRS undertook a live project to develop a revised settlement layout based on medium-density, incremental dwelling typologies (**residents' subject, artefact,** and **community**) (LWP4b, see Figure 5.9). This project would build on initial feasibility studies, prepared by AK, that DF had reviewed and supported. These studies were presented to WQ and the resident leadership, who also engaged in peer exchanges facilitated by ISN (Kumar, 2016). The live project would provide an opportunity to develop the feasibility

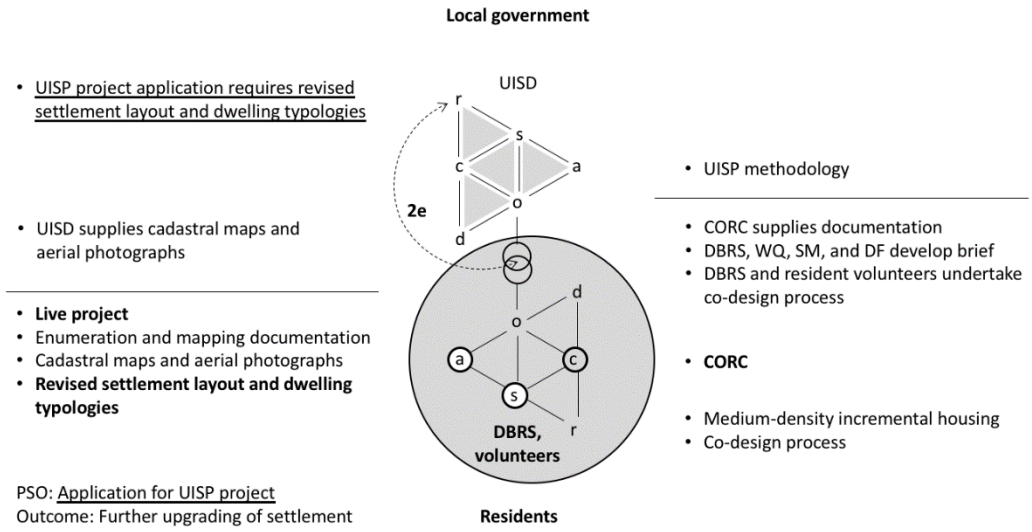

Figure 5.9 Knot LWP4b: DBRS, CORC, and resident volunteers undertake a live project to develop a revised settlement layout based on medium-density, incremental dwelling typologies. Diagram by author

studies further and, as such, is evidence of the cumulative nature of informal settlement upgrading (Hendler & Meke, 2015). The outcome of the live project would then support an UISP application to the UISD, based on funding from the Urban Settlements Development Grant (USDG) for services infrastructure and the Human Settlements Development Grant (HSDG) for the dwellings themselves (Faure, 2016; Kohler, 2016). The project brief was developed by DBRS, WQ, DF, and a town and regional planner from CORC (SM) who took over the role of AK, who had recently taken up employment at another local NGO. CORC supplied documentation from the mapping and enumeration that had been conducted prior to the relocation in 2011, and the UISD supplied cadastral maps and aerial photography (Figure 5.10).

The 25 B.Tech. (Architectural Technology) students who took part in the live project were introduced to Lwazi Park by WQ, DF, and SM during a site visit to the settlement, and interviewed the resident volunteers about their needs and desires for the upgrading of the settlement (Figure 5.11). Upon their return to the DBRS studio, the students conducted a site analysis based on the information provided by CORC and the COCT, as well as interviews they had conducted during the site visit. The purpose of the site analysis was to develop an understanding of the existing physical context and spatial planning issues before commencing with the co-design process. As a result of the reblocking, the overall spatial pattern was relatively logical and there was a fair degree of separation between shared spaces (including a tuck shop, a barber, and a *shebeen*[4]) and more private spaces. This spatial pattern reflected the strong societal structure

[4] A *shebeen* is an informal tavern or bar, often serving traditional African beer.

Figure 5.10 Aerial photographs indicating the development of Lwazi Park between 2010 and 2017. Photographs: Google Earth, 2017

Figure 5.11 The site visit to Lotus Park at the start of the live project Photograph: DBRS, 2015

in the settlement, despite disoriented living conditions. The triangular shape of the portion of land on which Lwazi Park is located (typical of the left-over, marginal land where informal settlements are often found) was identified as a challenge. One of the adverse results of this shape was the inappropriate position of a hard court built by the COCT soon after the relocation in 2011, which was adjacent to a secluded area along the canal. As a result of its secluded location, residents deem the hard court unsafe due to a lack of passive surveillance, instead letting their children play near a footbridge that connects Lwazi Park with Barcelona, on the opposite side of the canal.

Once the site analysis had been completed, the students and resident volunteers embarked on a co-design process at the DBRS studio. The development of settlement layouts was undertaken in groups and proved to be an interactive and fluid process punctuated by input from SM, WQ, and one or two resident volunteers. In the groups, each student developed their own conceptual layout diagram. Afterwards, these diagrams were discussed in the group, and the best ideas from each conceptual layout combined into a new iteration (Figure 5.12). This became a rich process due to the variety of voices, with different layout options being tested as overlays over existing maps and aerial photography. Open spaces had to be designed with specific functions in mind (such as shared washing lines) as the resident volunteers made it clear that any open or left-over space would be appropriated for housing should it its function not be clearly defined.

There was a need to balance two opposing issues: sufficient access to and passive surveillance of shared facilities, and sufficient security for the private, residential areas. Furthermore, the resident volunteers specified that each dwelling unit should have a direct relationship with the ground, preferably with a small front yard, and that dwelling units would be expanded incrementally as each household adapted their unit as their needs evolved over time. The relationship between students and resident volunteers was crucial to the co-design process, as it triggered an empathy that contributed to the success of the design outcomes, and provided access to the situated knowledge of the residents themselves. In order to allow the incremental expansion of dwelling units, all the groups decided to opt for a semi-detached double-storey core structure to be funded from the HSDG subsidy, with sufficient abutting space for future expansion by residents themselves. Construction materials and methods appropriate to this strategy were explored in terms of cost, performance, and availability.

While a substantial portion of the development of the dwelling typologies fell within the realm of the expert knowledge that the students were used to applying in their design projects, the resident volunteers provided essential information about the relationship between spaces and functions, the preferred position of shared facilities, as well as the internal layout of dwelling units. The students appreciated the fact that residents are entitled to contribute to the planning and design of their own dwellings, and that sound technical knowledge can sometimes produce undesirable results if user requirements are not carefully considered. They were also sensitised to the importance of addressing short-term needs while allowing the opportunity for long-term aspirations to be addressed at a later stage.

Figure 5.12 Iterative development of the revised settlement layouts in groups
Photograph: DBRS, 2015

During the co-design process, a primary contradiction emerged within the residents' rules. This contradiction entailed the need to explore alternative technologies (in order to ensure cost-effective solutions) and cultural expectations, particularly relating to the choice of construction material (LWP4c). This contradiction was overcome by peer exchanges facilitated by ISN, where WQ and the resident volunteers met with residents from other informal settlements who had employed alternative construction technologies in their upgrading interventions (**local government subject, community,** and **division of labour**) (LWP4d). It was important for students to convey their technical knowledge to the resident volunteers in a persuasive and accessible manner; for example, in explaining that – while brick and mortar, the residents' preferred material, is indeed a quality material – there are also other suitable construction technologies, such as composite panels or sand bag construction (Figure 5.13). Unfortunately, as the live project unfolded, a lack of social facilitation by CORC (as SM had to attend to CORC projects outside of Cape Town) and the resultant sporadic presence of resident volunteers (exacerbated by a lack of transport and competing priorities of their own) in the DBRS studio led to frustration and difficulty in sustaining the pace of the co-design process[5].

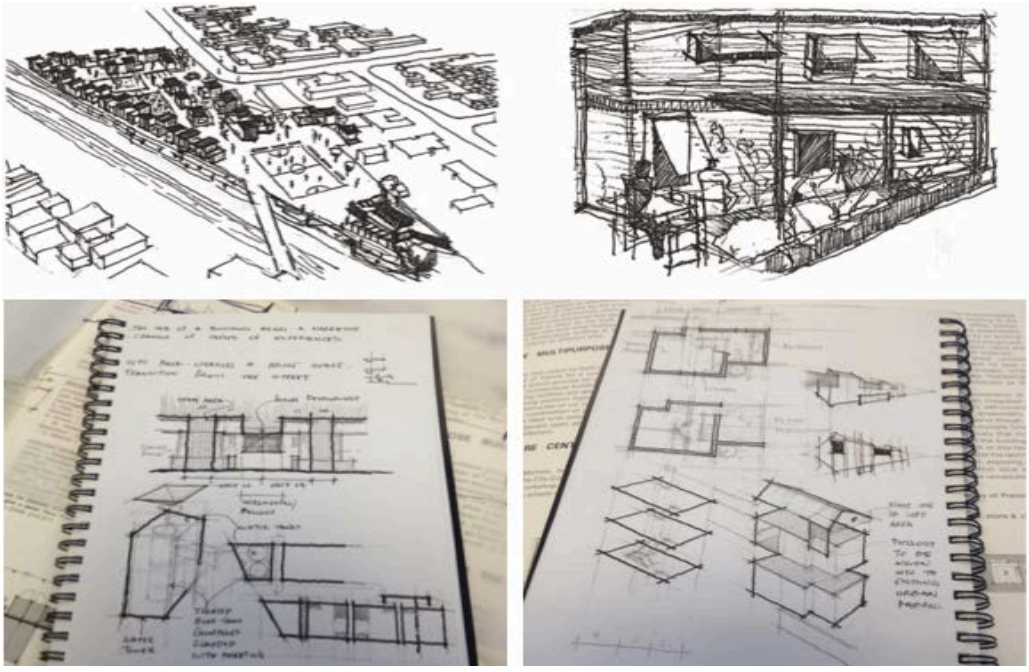

Figure 5.13 Collaborative explorations of different dwelling typologies and construction technologies. Photograph: DBRS, 2015

5 This problem was also raised by Winckler (2013: 224) in her reflection on the lack of guidance provided by CORC during the more challenging stages of a live project that she had facilitated with the NGO at UCT. She suggests that in addition to the roles and responsibilities of all participants being explicitly articulated at the onset of collaborative projects, these should be reviewed as the project progresses.

Nonetheless, when WQ and the resident volunteers were present, important issues were raised and their situated knowledge proved integral to the development of both the revised settlement layout and the dwelling typologies. Some students also found that interacting with SM during the briefing and site visit was less challenging than engaging with the resident volunteers (this can be ascribed to a lack of informal capacities), as SM understood both the residents' and the students' perspectives. However, the interaction between the students and resident volunteers during the co-design process also provided opportunities to reconcile their often differing perspectives on the project. After the completion of the live project, it was agreed that the settlement layouts and dwelling typologies would be presented to the resident leadership at Lwazi Park. Unfortunately, this presentation has never transpired as SM resigned from CORC soon after the conclusion of the live project, and CORC was inundated with work, having been appointed by the WCG to undertake enumerations in seven informal settlements, including Lwazi Park, in preparation for a catalytic mega-project in the Airport Precinct. As such, the further upgrading of Lwazi Park has been delayed indefinitely by its incorporation into the WCG mega-project (Kohler, 2016).

The four GAP knots that were identified in this case study (LWP1c, LWP2c, LWP3c, and LWP4b) will form part of the comparative analysis of the empirical findings in section 6.1, so as to contribute to the identification of patterns that relate to the emergent mode of architectural practice that is being explored. The discussion of the second case study will commence in the following section.

5.3 Lotus Park neighbourhood centre and spatial intervention

5.3.1 Background and selection rationale

During 2016, DBRS and VPUU collaborated on the second live project that informs this research, facilitating the collaborative design of a spatial intervention adjacent to a neighbourhood centre (NHC) at Lotus Park, Nyanga.

5.3.1.1 Violence Prevention through Urban Upgrading (VPUU)

VPUU is a NPO that originated in September 2005 as a joint project of the COCT, the Federal German Ministry for Economic Cooperation and Development, the German Development Bank, the SA National Treasury, and the residents of Khayelitsha (Cooke, 2011b: 18). The project partnership has since been extended to include the WCG, international agencies, and local NGOs and CBOs. VPUU NPO was established in April 2013 to implement the VPUU programme in the Western Cape Province, with Sustainable Urban Neighbourhoods (SUN) Development (Pty.) Ltd. as their implementation agent (VPUU, 2016). The first phases of the VPUU programme were

implemented in the Harare district of Khayelitsha, and have since progressed to other areas in Khayelitsha. The programme has also been piloted in a number of informal settlements across Cape Town since 2010 (Uğur, 2014: 115). As a comprehensive area-based community development programme, VPUU aims at safe and integrated communities, citizenship, pride, and the improvement of quality of life for all residents in local neighbourhoods. VPUU endeavours to overcome economic, cultural, social, institutional, and spatial exclusion, so as to reduce crime. The programme follows a research-based approach which incorporates elements of international best practice, combined with the concept of asset-based development (informed by the SA context) in order to ensure that interventions are locally owned and determined (Ewing, 2015: 28). Through SUN Development as their implementing agent, VPUU has a mandate to negotiate solutions between residents and the local government. While residents and their leadership are able to adapt to such an incremental, participation-driven approach, it does pose challenges to the COCT, with its governmentality based on infrastructure development and budget expenditure (Krause, 2008: 103). Cooke (2011b: 19-22) identifies four ideas that underlie the success of the VPUU programme:

- Process is as important as product. This entails fostering project ownership by means of transparent, participative, and generative processes, so as to (i) allow residents and their leadership to know what is going on, and to feel that their view is an essential part of decision-making and that the project can benefit them as individuals; (ii) establish project committees (an equal split between civic and political stakeholders); and (iii) recruit volunteers.

- An area-wide approach, enabling a broad strategy towards crime prevention, premised on an appreciation of the important role of the environment in shaping crime.

- Integration in terms of spatial, social, economic, and management concerns, ranging from social programmes (e.g. neighbourhood patrols and youth projects) to institutional programmes aimed at improving service delivery and local economic development.

- Monitoring and feedback to sustain that which has been co-created, through monthly surveys and meetings to share information and to make plans, thereby developing a framework of social structures to support ongoing interventions.

The implementation of these four ideas requires agreement w.r.t. the role of each programme partner. The respective roles of the COCT, VPUU, and residents are described in Table 5.2. These roles have enabled VPUU to develop a research-based and highly participatory intervention methodology (Table 5.3), consisting of five phases premised on healthy development processes and a significant investment of time in the development of residents' capacities. Furthermore, the VPUU methodology entails five programmatic, integrated workstreams, that are complemented by a multi-disciplinary team at the core of the programme. The workstreams are (i) Situational Crime Prevention, (ii) Social Crime Prevention, (iii) Institutional Crime Prevention, (iv) Community Participation, and (v) Knowledge Management (VPUU, 2016). The Situational Crime Prevention

Table 5.2 The respective roles of local government, intermediary agent, and residents Adapted from Uğur (2014: 166-167)

The respective roles of local government, intermediary agent, and residents	
Programme partner	**Role of programme partner**
Local government (COCT)	Acceptance of VPUU methodology and importance of working with local communities as partners. Ensuring dedicated line department support. Budget allocation and provision. Operational arrangements. Appointment of specialised technical expertise where needed. Provision of land, and general oversight.
Intermediary agent (VPUU)	Facilitation of process and methodology (according to VPUU philosophy). Implement specific elements of the projects, including community participation; stakeholder management; reporting; urban design; land-use management including development of tenure regime; certain social interventions; and monitoring and evaluation. Skills development of COCT officials, and partnership development.
Residents	Acceptance of methodology and partnership with the COCT as a pre-requisite for programme commencement. Competent leadership to ensure community buy-in. Assistance during implementation and maintenance by contributing to the delivery of services. Ensure that number of households remain stable throughout project.

Workstream – also referred to as the "Built Environment Workstream" (BEW) – has as its main focus the upgrading of the public realm in the SNA, with a focus on urban design, architecture, planning, and construction. This workstream employs a design approach based on three hypotheses in relation to crime prevention: one social, i.e. that reclaiming the public spaces and positively occupying dangerous spaces will reduce opportunities for crime; one situational, i.e. that the implementation, improvement, and management of public spaces impact positively on how residents perceive such spaces; and one institutional, i.e. that involving residents in the ownership and management of spaces ensures a sense of citizenship, which in turn improves community cohesion and reduces the risk of violence and crime (Ewing, 2015: 29). As any physical intervention in the SNAs must be reviewed and approved by the COCT and WCG, the BEW follows a "package of plans" approach (Figure 5.14) to identify, design, plan, and construct interventions. This flexible approach follows a logical series of design phases, commencing with an urban design concept plan that is refined into precinct plans for parts of each SNA; then project plans for projects identified within each SNA; and lastly, detailed building plans for the construction phase of each intervention. The package of plans approach facilitates the approval processes required by local government as well as residents, and as such participation by residents is central to each design phase (VPUU, [n.d.]b).

Table 5.3 VPUU's research-based and highly participatory intervention methodology
Adapted from Krause (2013: 26-27) and (VPUU, [n.d.]a: n.p.)

VPUU's research-based and highly participatory intervention methodology	
Phase	**Description**
1. Social compact and profiling	Establishing a social compact with residents of the settlement concerned, referred to as a safe node area (SNA). This entails the establishment of a representative safe node action committee (SNAC), whose first task it is to facilitate a baseline survey with a sample size of between five and ten percent of the total number of households in the SNA.
	Outcome: Mature representative local leadership and a baseline survey.
2. Planning	Combining of residents' ideas for their settlement with the COCT's urban development vision, as described in the five-year IDP. This takes the form of a community action plan (CAP) that includes decisions about priorities, the phasing of interventions, and the manner in which the participatory design process will unfold.
	Outcome: Development of local area strategy (i.e. a CAP) linked to the five pillars of the IDP, business plans, and resource allocation.
3. Implementation	Interventions are made through a partnership including the COCT, VPUU, and NGOs, as well as local groups and organisations. This phase includes skills development to enhance local capacities and is structured according to five implementation milestones: (i) brief and scope of works, (ii) concept design, (iii) design development, (iv) building plan, technical design and tender, and (v) handover from contractor to residents[6].
	Outcome: Physical and non-physical assets.
4. Operation, maintenance, and management	Operation, maintenance and management of the facilities and spaces, and fostering the sustainability of the intervention through capacity building, improved safety, and enhanced economic activity.
	Outcome: Safety and the resident-driven delivery of services.
5. Monitoring and evaluation	The continuous monitoring of the intervention, supported by an annual evaluation and review of the CAP.
	Outcome: Knowledge management and quality assurance.

6 These milestones correspond roughly with the architectural practice work stages, as defined by SAIA in their client-architect agreement (SAIA, 2008: 1).

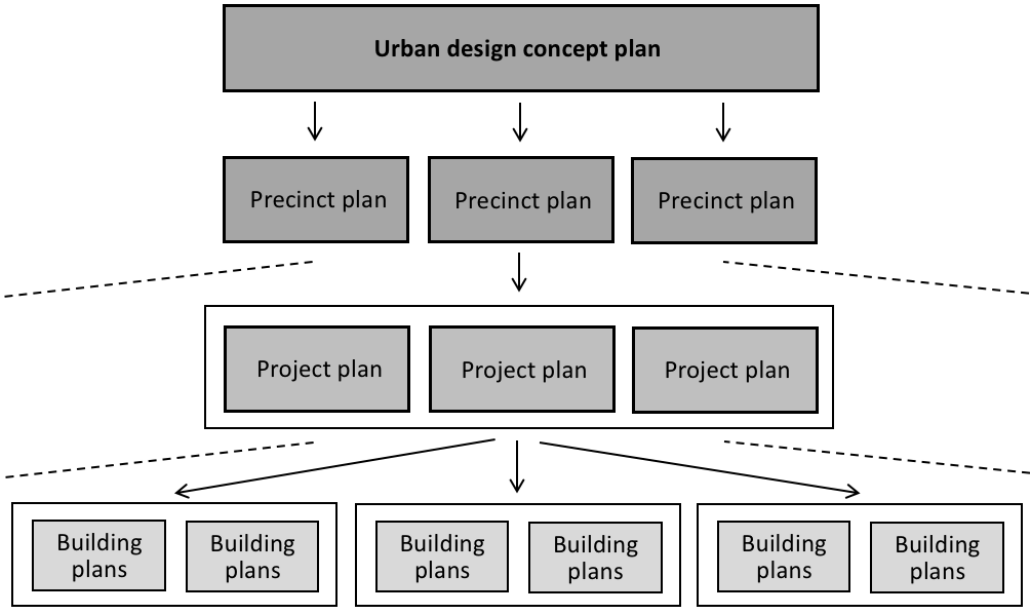

Figure 5.14 The "package of plans" approach of the VPUU BEW
Diagram by author, based on VPUU (2016)

5.3.1.2 Lotus Park

In response to a number of service delivery protests across Cape Town during 2009 and 2010, the COCT established the Informal Settlement Transformation Programme (ISTP). VPUU was to implement the ISTP by adapting its violence prevention methodology to an informal settlement context, using an incremental and *in situ* developmental approach to service provision and settlement upgrading (Uğur, 2014: 166). After Monwabisi Park (in Khayelitsha), Lotus Park was the second pilot site where the ISTP was implemented (VPUU, 2014c). During the 1980s, Lotus Park was a forested area, located between the Metrorail Central Line (Cape Town to Khayelitsha) and the Lotus River canal. Footpaths that led from the nearby Nyanga Junction station to Gugulethu were subject to frequent robberies, especially during early mornings and late evenings (VPUU, 2011). By the mid-1990s, the area had gradually become deforested by Gugulethu residents collecting firewood, and the resultant open field (which was still considered to be dangerous, due to its location between Manenberg and Gugulethu) soon became a dumping ground for household refuse.

In 2001, the COCT allocated the area as residential land for flooding victims who were living in Waterfront, on the opposite side of the canal (ACC, 2015). Sites were surveyed and water points and toilets (one for every four sites), as well as electricity poles and high level flood-lighting, were installed (Potgieter, 2016). A local steering committee was elected to manage the allocation of sites and during late 2003 the first residents from Waterfront moved into Lotus Park. They were followed by flooding victims from Gxagxa during 2004, as well as backyard

dwellers from the nearby Khikhi hostel. Conflicts subsequently arose as three groups of people were now competing for the same area. These conflicts were exacerbated by corruption as committee members tasked to allocate sites instead sold them in a disorganised manner. During 2009, despite continued conflict (resulting from division along political lines), residents undertook a service delivery protest, with bucket system sanitation and the dangerous environment in their growing settlement as key issues (VPUU, 2011).

Soon after the COCT introduced the ISTP, VPUU was introduced to the residents of Lotus Park as the NPO that would facilitate the implementation of the ISTP in their settlement by acting as an intermediary between residents, the COCT, WCG, and other local stakeholders (Figure 5.15). The ISTP enables the COCT to upgrade informal settlements with a more partnership-based model founded on both bottom-up and top-down processes (Ewing, 2016). VPUU engaged all local stakeholders to present their aims and processes, and mediated a negotiation process to address individual disagreements between members of the resident leadership (VPUU, 2016). During November 2010, a community facilitator was employed by VPUU to facilitate the development process. VPUU and the community facilitator had an intense engagement with the resident leadership for three months in order to reach a common understanding (VPUU, 2015: n.p.). Once this had been achieved, in February 2011, it was agreed that a SNAC should be established. The community facilitator conducted an audit of local groups to ensure that the SNAC would be representative, and in March a first workshop was held with the SNAC as the new leadership of Lotus Park. During this workshop it was proposed that elections be held to ensure that the SNAC is acceptable to all residents. These elections were held in April, after which the composition of the SNAC was finalised (VPUU, 2016).

In June 2011, VPUU and the SNAC held a community profiling workshop – together with the resident leadership, professional consultants, and local government officials – in order to develop a common vision for the development of Lotus Park. Information relating to the history of the settlement, the upgrading process, local concerns and priorities, as well as the methods and delivery of the baseline survey which was to be conducted next, was shared. Participants were divided into four groups, and each group articulated their vision for Lotus Park through words and drawings (VPUU, 2011: 9-10). The consolidated vision reads as follows (VPUU, 2011: 14):

> "Our vision is to see a well-developed Lotus Park where each family has a numbered site with one tap and one toilet. We would like to see a Lotus Park clearly zoned into areas A, B, C, and D, with well-planned streets in between rows of houses, with a drainage system to avoid flooding, and with street lights. The railway line must be fenced to prevent illegal crossing and accidents. The canal, which is a health hazard and accident zone for our children, should be enclosed. We should have a community centre / hall where the SNAC offices can be housed, as well as a mobile clinic, soup kitchen, police satellite station, and patrol / volunteer offices. There should also be a small business centre where all businesses from Lotus Park can trade. Our children must play in safe spaces with playground facilities, including sports fields for the youth."

Figure 5.15 Development of Lotus Park from 2001 up to 2009, prior to the commencement of the ISTP project. Photographs: Google Earth, 2017

Based on the findings of the community profiling workshop, a random sample baseline survey (involving between five and ten percent of the settlement population) was conducted to obtain more information about the views of residents and to provide an opportunity for all residents to hear about the proposed upgrading and to be informed about the existence, and next meeting of, the SNAC (VPUU, 2016). The survey also meant that upgrading could start with a thorough knowledge of local conditions, concerns and priorities, and provided a baseline against which the impact of the upgrading could be measured. The SNAC nominated volunteer fieldworkers to conduct the survey. They received two days of training before conducting the survey over three days in July 2011. As Lotus Park is a relatively small settlement and set out on a grid layout with relatively well-defined roads, the baseline survey was conducted without much difficulty (VPUU, 2011: 9). The baseline survey informed the CAP which, as discussed above, includes decisions about priorities, the phasing of interventions, and how the participatory design process will unfold. The CAP was developed by the SNAC, working together with all five VPUU workstreams. Part of this process was a workshop where the issues, assets and needs identified by residents during the baseline survey were compared to those identified by the leadership (VPUU, 2016). These were then organised into short-, medium-, and long-term priorities, after which links were made with the relevant COCT departments to address the issues that were identified (e.g. a need for safe places for children to play was addressed by the COCT Recreation and Parks Department).

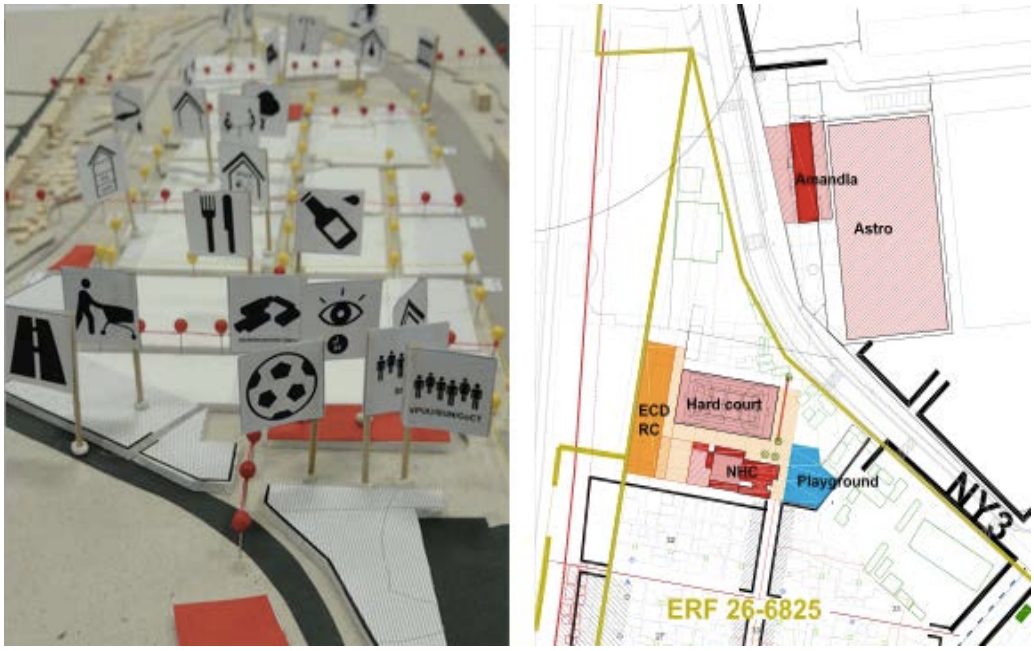

Figure 5.16 A model used during the development of the spatial reconfiguration plan (SRP) (left), and the draft SRP indicating the NHC precinct plan (right)
Photograph and drawing: VPUU, 2016

During the latter half of 2012, after the conclusion of the CAP, work commenced on the development of a spatial reconfiguration plan (SRP), a medium-term project which forms part of the CAP (Figure 5.16). The SRP is an urban design framework tailored for incremental *in situ* upgrading. In consultation with all stakeholders (including local groups and COCT departments), this framework identifies the nature of interventions and priorities relative to strategies, programmes, timeframes, and budgets (Ewing, 2016). For Lotus Park, the SRP included a subdivision plan to enable incremental tenure, as well as a precinct plan for a NHC, ECD resource centre, and a business incubator with mixed-use live-work units (VPUU, 2014c; Potgieter, 2016). While the NHC has been successfully implemented, changes in the membership of the SNAC have resulted in challenges with the implementation of the ECD resource centre as new members of the SNAC are not aware of the decisions embedded within the SRP (Ewing, 2016).

5.3.1.3 Selection rationale

VPUU has had a significant impact on the situational, institutional, and social development in its intervention areas, and their work contributes to the creation of safer and more sustainable neighbourhoods in Cape Town (Uğur, 2014: 162). In the case of informal settlement interventions, the VPUU methodology reinforces existing public space systems so as to enhance the social fabric ahead of major infrastructural upgrades, as these tend to result in social engineering and marginalisation by negating open-space systems, social networks, and even topography, in favour

of simple engineering solutions. By defining interventions on a neighbourhood scale – clearly demarcated in geographical and social terms so as to avoid excessive complexity – all residents are allowed to participate in the upgrading process (Krause, 2013: 27-28). VPUU's understanding of sustainability encompasses capital infrastructure (spaces and facilities), residents' skills levels, social cohesion via social support, improved safety levels, and economic improvement. This understanding is underpinned by a paradigm shift from local government defining problems and assembling resources, to a partnership between residents, civil society, and local government to identify and address local problems collaboratively (VPUU, 2016). Since 2005, VPUU has honed its ability to create multiple partnerships, negotiate solutions, and provide access to a transversal team of professionals. The ISTP has provided an opportunity for VPUU to test its methodology in an informal settlement context, and their work in informal settlements is based on an understanding that residents have the right to remain in their settlements, both during and after upgrading (Krause, 2008: 102). Beyond reducing crime, VPUU nurtures civic responsibility and community cohesiveness, and has sparked economic activity, employment, and training opportunities by creating networks of new urban spaces with connected community facilities, recreation spaces, and improved schools (Cooke, 2011b: 18). The architectural practice embedded within VPUU's BEW supports residents in their transitions to sustainable urbanism. As such, an exploration of VPUU's work in Lotus Park contributes to the overall aim of the research presented in this dissertation.

5.3.2 Descriptive narrative and mapping

5.3.2.1 Neighbourhood centre (NHC)

The SRP included a NHC, which was to function as a safety catalyst that provided community facilities. The site identified for the NHC was an existing refuse dump site (Figure 5.17), adjacent to a small kickabout space to the north of Lotus Park and in close proximity to the Nyanga Junction station (Ewing, 2015: 30). While residents prioritised the NHC as a medium- to long-term priority, VPUU realised that the vacant dump site provided an opportunity to provide desperately needed community facilities in the short term. Other existing facilities adjacent to the site included a shebeen, a scrapyard, a tent church, an ECD facility, shipping containers housing *spaza* shops[7] and small workshops, and a walkway which formed the central spine of the settlement. During its initial engagements with the residents of Lotus Park, VPUU had used a shipping container (located between the tent church and the ECD facility) as a meeting space. As this proved to be an impractical arrangement and they often had to make use of the tent church instead, it was clear that the construction of a NHC was indeed a short-term priority (Ewing, 2016). The project brief for the NHC was developed by the SNAC and an architect from

7 A *spaza* shop is a small, informal convenience shop that is often located adjacent to the owner's dwelling.

Figure 5.17 The existing refuse dumpsite identified as the site for the NHC
Photograph: VPUU, 2016

VPUU's BEW (SP, see Table 5.4) during March 2012, in conjunction with local groups and future users of the NHC. The project brief included offices for the community facilitator, the SNAC, and other local groups, as well as a hall, meeting rooms, ablution facilities, storage, a kitchen, *spaza* shop, general worker's apartment, and ECD facilities (Ewing, 2015: 30).

SP facilitated the NHC co-design process, which entailed each iteration of the design being presented at the SNAC's weekly meeting, with members of local groups, future users, and representatives from each VPUU workstream present (Figure 5.18). The SNAC then consulted with a broader group of stakeholders, including the ward committee, and reported back in order to inform the next iteration of the design. Three contradictions arose in the residents' activity system as a result of the collaborative nature of this process. The first two were a primary one within the subject (communication between SP and the SNAC, local groups, and future users proved to be difficult) (LTP1a) and a secondary one between an artefact (technical architectural drawings) and a rule (co-design process) (LTP1b). The latter contradiction was resolved by SP introducing cardboard models in the co-design process as a less abstract form of architectural communication (**residents' artefact**) (LTP1c, see Figure 5.19). The third contradiction was also a secondary one, between the same artefact (technical architectural drawings) and a different rule (each iteration approved by SNAC, local groups, and future users) (LTP1d). This contradiction was resolved by the collaborative development of user scenarios (facilitated by SP and the VPUU workstream representatives) to envisage the activation of the NHC (**residents' subject, artefact, community,** and **division of labour**) (LTP1e, see Figure 5.20).

Figure 5.18 A meeting with the SNAC during the concept design process for the NHC
Photograph: VPUU, 2016

Table 5.4 Role players in the Lotus Park case study
Table by author

Role players in the Lotus Park case study	
Initials	**Role**
AJ	Local contractor, employed by VPUU
AM	Safety promoter, VPUU Social Crime Prevention Workstream
KE	Workstream leader, VPUU BEW
MC	Structural engineer
MM	District manager, COCT Cape Flats and Gugulethu District
MP	Community facilitator, VPUU Community Participation Workstream
MS	Nodal coordinator for Lotus Park, VPUU Project Management Workstream
RH	Plant manager, National construction company
SP	Architect, VPUU BEW
WB	Part-time Construction Technology lecturer

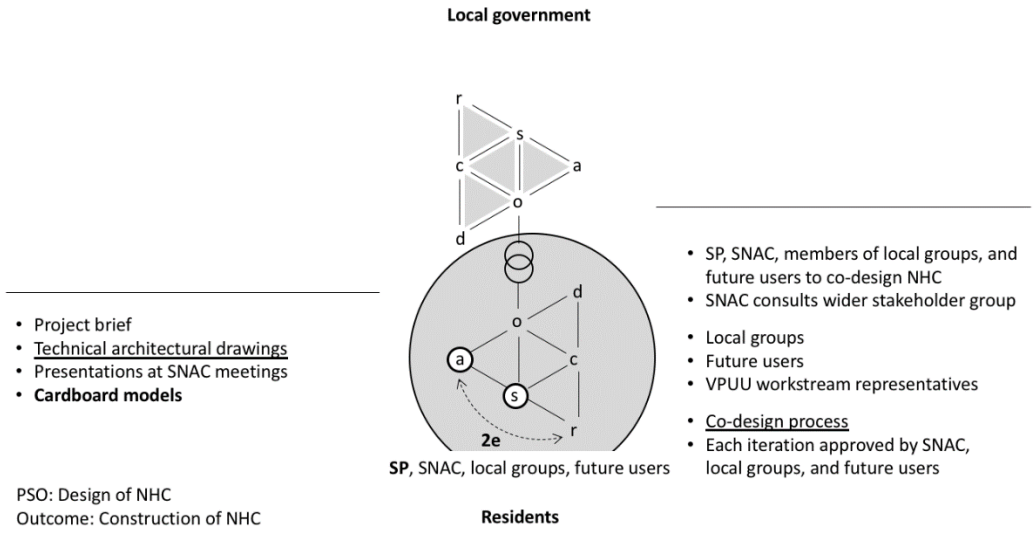

Figure 5.19 Knot LTP1c: SP introduces cardboard model to the co-design process as a less abstract form of architectural communication. Diagram by author

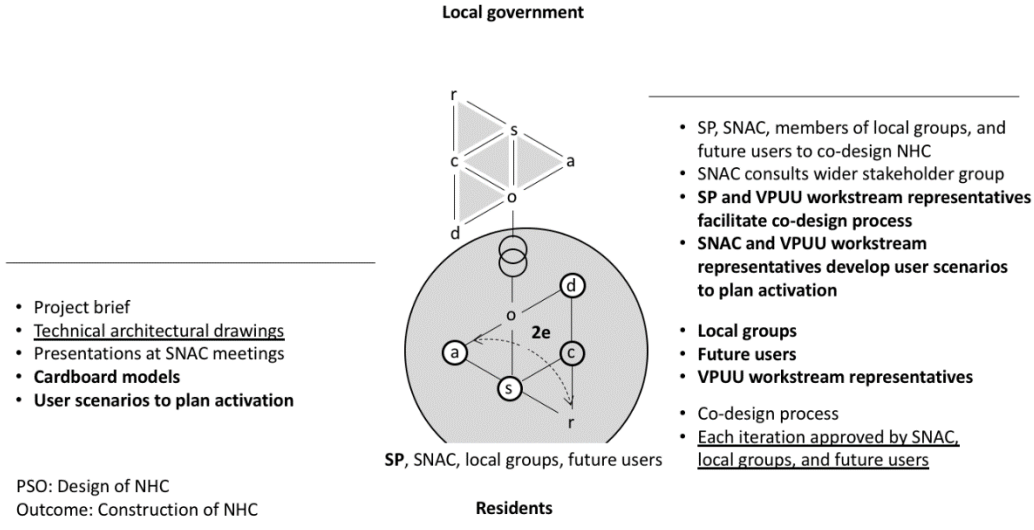

Figure 5.20 Knot LTP1e: SP and the VPUU workstream representatives facilitate the collaborative development of user scenarios to envisage the activation of the NHC. Diagram by author

The combined effect of the knotworking that resolved the two secondary contradictions (LTP1b and LTP1d) led to the resolution of the initial primary contradiction, relating to architectural communication, within the residents' subject (LTP1a). This long, iterative process was further complicated by several changes in the membership of the SNAC and was only concluded in June 2012 (Potgieter, 2016). The design was then presented to residents at a public meeting at the end of June 2012. Over the next three months, further meetings were held with the SNAC to refine the design, which received final approval from the SNAC in early September. Subsequent to the design of the NHC having been approved, during October, workshops were held with the different user groups to plan for the activation of the spaces in the building (VPUU, 2014a: n.p.).

At the same time, the VPUU BEW also started preparing the documentation required for an application for local government approval for the construction of the NHC. The approval process was complicated by the fact that, as Lotus Park is an informal settlement and the land on which it is located is zoned for utility services, the COCT Land Use Management and Building Development Department (LUM & BDD) could not grant approval for the construction of a permanent structure of a public nature on that land. This resulted in two secondary contradictions involving the PSO (construction of the NHC) – one with a local government artefact (zoning scheme) (LTP2a) and one with a local government rule (zoning scheme does not allow permanent structure of a public nature) (LTP2b) – as well as a quaternary contradiction resulting from the residents' contention that a temporary structure would not provide them with the sense of permanence they required for the settlement upgrading to be sustainable (Ewing, 2016). Accordingly, the latter contradiction was between a residents' rule (NHC must have a sense of permanence) and a local government rule (zoning scheme does not allow permanent structure of a public nature) (LTP2c).

Drawing on the fact that shipping containers were already in use on the site, the VPUU BEW and the SNAC decided to use a combination of shipping containers and sandbag construction for the NHC. However, the use of sandbag construction (with patented Ecobeam structural components) limited the height of the hall to a double volume, and the entire building had to be designed on the same module as the shipping containers. The district manager of the COCT Cape Flats and Gugulethu District (MM) assisted VPUU by obtaining advice from the LUM & BDD regarding the use of shipping containers for a public building, as well as the approval procedures that this would require (Ewing, 2016). Due to the utility services zoning which stipulated that a temporary structure had to be erected, it was not possible to submit an application for the erection of a permanent structure. Instead, an application for the erection of a temporary structure was submitted to the LUM & BDD during June 2013. The COCT Human Settlements Department signed as the owner of the land, and the workstream leader of the VPUU BEW (KE) submitted the application on behalf of that department. This application included a full set of architectural and engineering drawings, and resulted in a primary contradiction within the local government rules: Land Use Management officials (concerned with adherence to the zoning scheme) required the NHC to be a temporary structure, while Building Development officials (concerned with adherence to the NBR) required a reinforced concrete foundation to ensure the structural integrity of the building (LTP2d) (Potgieter, 2016).

MM assisted VPUU in obtaining approval for the structure from the Fire Safety Department, which was initially opposed to the use of shipping containers and sandbag construction for a public building. Furthermore, as the shipping containers that were to be used would be adapted to allow for doors, windows, and insulation panels, a structural engineer would have to submit a certificate stating that they were structurally sound and fit for use once the building was completed. During August 2013, approval was granted for the erection of the NHC as a temporary structure. MM stood central in the knotworking that resolved the contradictions pertaining to the approval process: she expedited the approval process for a temporary structure within her district LUM & BDD, provided information w.r.t. the use of shipping containers for a public building, and assisted in obtaining approval from the COCT Fire Safety Department (**local government subject** and **division of labour**) (LTP2e, see Figure 5.21). Despite the quaternary contradiction (LTP2c) remaining, the upgrading intervention was able to continue after approval for the erection of a temporary structure had been obtained. However, this approval was subject to an onerous local government rule, i.e. that the occupancy certificate and certificates of compliance to be issued upon completion of the NHC would have to be renewed after each yearly inspection of the structure by the COCT Fire Safety Department (Ewing, 2016; Muller, 2016).

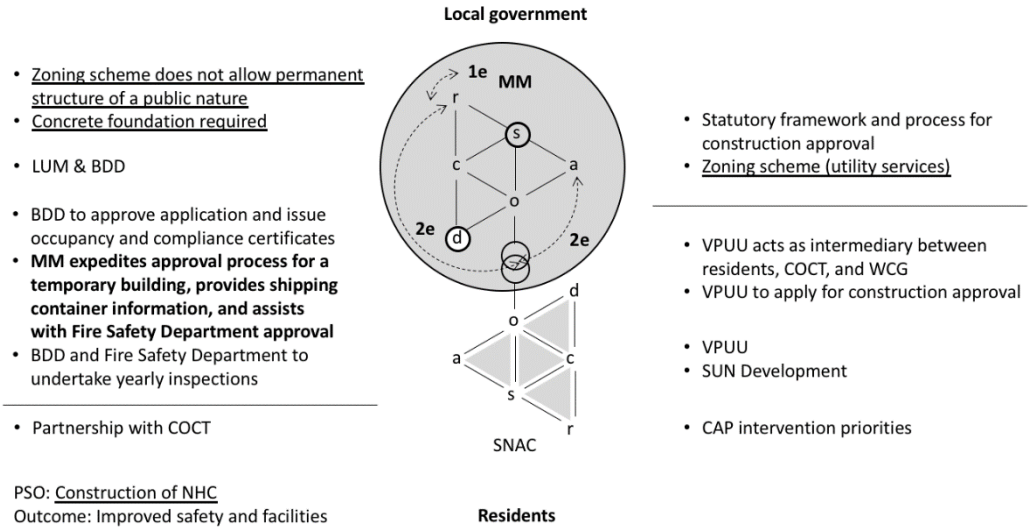

Figure 5.21 Knot LTP2e: MM expedites the approval process for a temporary structure, provides information w.r.t. the use of shipping containers for a public building, and assists in obtaining fire safety approval for the NHC as a temporary structure. Diagram by author

The tender process for the NHC ran concurrently with the local government approval process, and an open tender was advertised in two free-of-charge local newspapers (Vukani and City Views) at the end of November 2012, shortly after the approval of the design by the SNAC. By mid-December, two tenders had been received, but after the review of the tenders (during January and February 2013) it was decided that both were too expensive. This set in motion a review of the design for the NHC, after which a new tender was negotiated with one of the two contractors, who had agreed to extend the validity period of the tender. The tender negotiation was concluded in May 2013, after which the application for the erection of a temporary structure was submitted to the LUM & BDD. After approval was granted during August 2013, construction could commence (VPUU, 2014a: n.p.). The site handover took place at the end of September and was attended by the professional team, consisting of two VPUU architects (KE and SP), a quantity surveyor, a structural engineer (who acted as principal agent), as well as political dignitaries ("who appeared out of nowhere" (Ewing, 2016)) and over a hundred Lotus Park residents.

When construction commenced in October 2013, the construction site was cordoned off due in part to the contested relationship between VPUU and the owner of the adjacent scrapyard. This conflict resulted in death threats and a potential risk of building material being stolen. However, once the owner of the scrapyard understood that VPUU did not pose a threat to his livelihood – and wanted to work with, rather than against him – work could proceed unhindered (Ewing, 2016). SP conducted site visits twice a week to oversee the construction work (Figure 5.22). This role was very hands-on, as she had to show – rather than tell – what needed to be done to rectify work that did not meet her approval. Very few members of the construction team were able to interpret architectural drawings, necessitating the use of photographs and models to communicate the design of the building. The sandbag wall of the double volume hall, for example, had to be rebuilt three times before it was perfectly straight (Ewing, 2016). The use of unfamiliar construction techniques such as the sandbag walls also posed further challenges that had to be resolved.

Women from Lotus Park filled the bags with sand before builders' recess in December 2013, and when they returned to site after the builders' recess they found that the bags had cracked from exposure to the sun. As the material used for the bags is not a standard building material, no-one could have foreseen that this would happen. The contractor also had to wait a long time for the patented Ecobeam structural components, as the supplier was not able to manufacture such a large custom order quickly. While the use of shipping containers simplified the construction of the building to a certain extent, it also posed some problems. When the retrofitted shipping containers were delivered to site by the specialist subcontractor who prepared them off-site, it was found that they deviated by twenty centimetres from the standard size on which the design of the foundation for the NHC was based. This resulted in a redesign of the affected parts of the building while construction was already underway. The shipping containers had to be taken back to the workshop while the foundations were recast in their new positions. However, once this error had been rectified, all the containers were installed in one day (Ewing, 2016).

Figure 5.22 The NHC site during construction: sandbag walls being constructed (top), shipping containers forming the courtyard (middle), and the hard court soon after completion (bottom). Photographs: VPUU, 2016

The construction period had been set for six months and the NHC was expected to reach practical completion at the end of March 2014. However, this date was postponed by two months as a result of extension claims by the contractor. Eventually the construction period was a full year, with the NHC reaching practical completion during June 2014 (VPUU, 2014a: n.p.). Many of the extension claims related to the complicated procurement process that had to be followed, as well as the requirement of employing residents, many of whom did not have the requisite skills to work with alternative (or conventional, for that matter) construction techniques. Three contradictions arose during the construction of the NHC, all pertaining to the latter requirement (which constitutes a residents' rule: employ residents as builders via the COCT subcouncil database). These contradictions entailed a quaternary one involving a local government rule (alternative construction techniques) (LTP3a) and two secondary contradictions – one involving a residents' artefact (limited skills and construction experience of resident builders) (LTP3b) and the other the PSO (construction of the NHC) (LTP3c). These contradictions were resolved by the contractor initiating a mentoring process to address the resident builders'

skills shortage, in effect constructing a new **local government artefact** to resolve the three contradictions (LTP3d, see Figure 5.23). The mentoring process addressed the resident builders' skills shortage by, for example, using one skilled plasterer to train five local plasterers. While this assisted in skills transfer, it is an incredibly expensive way to construct a small building with a limited budget. Nonetheless, the mentoring process proved to be so successful that VPUU now includes it as a separate item in all their tenders. The initiation of the mentoring process is deemed to constitute GAP by virtue of the skills transfer that it facilitated, and similar mentoring processes can be employed by architectural professionals to enable effective co-production and collaborative design interventions together with residents.

The pioneering nature of the construction techniques used necessitated a continual exploration of construction typologies, and the weighing up of appearance and speed of construction. Notwithstanding this, the Lotus Park residents were fairly accepting of the alternative construction techniques used – especially in comparison to the earlier projects that VPUU had undertaken in Khayelitsha, where residents preferred standard brick construction only. This is partly attributed to the fact that the NHC developed from idea to construction fairly quickly, without residents having been given too much time to mull it over. After the project had reached practical completion in June 2014, the VPUU BEW remained involved in the process of the SNAC and local groups settling into the building (Figure 5.24). Due to its nature as a temporary structure, the NHC had to be off-grid, without any municipal services connections (except for electricity). This required the installation of a solar water heater and a greywater recycling system (Ewing, 2016).

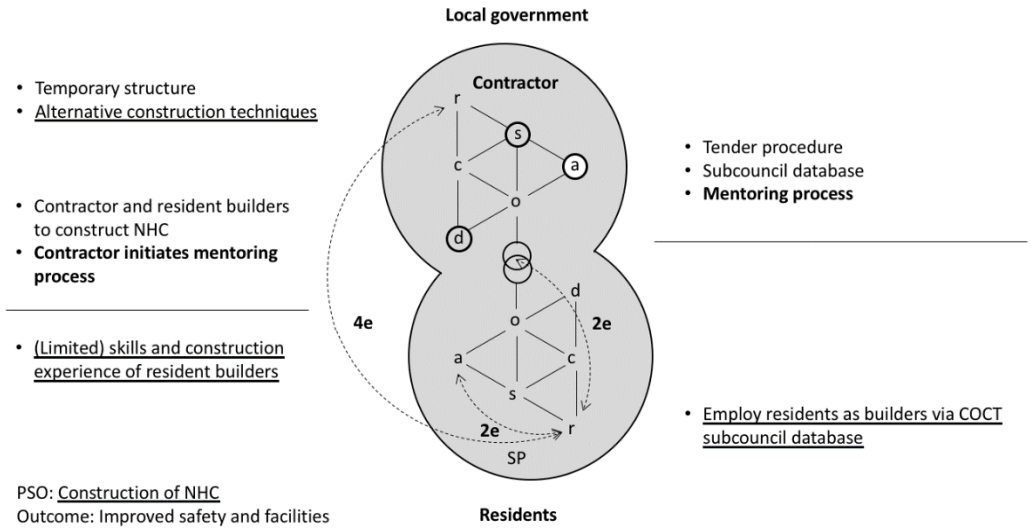

Figure 5.23 Knot LTP3d: A mentoring process initiated by the contractor resolved the contradictions relating to the employment of residents, their limited skills and construction experience, and alternative construction techniques
Diagram by author

Figure 5.24 The front entrance (top) and courtyard (bottom) of the NHC, shortly after its completion in 2014. Photographs: VPUU, 2016

However, a quaternary contradiction arose as a result of the inability of the SNAC and local groups, who were responsible for the day-to-day operation the NHC (residents' division of labour), to maintain the non-conventional systems that were installed in the place of municipal service connections (local government rule) (LTP3e). SP's involvement was extended well beyond the completion of the NHC in order to address these and other problems that arose during its operation (**residents' division of labour**) (LTP3f, see Figure 5.25). The extended involvement of the VPUU BEW was crucial in addressing the problems that resulted from the use of such non-conventional systems, as the connections to the septic and greywater tanks were switched during construction, resulting in both tanks being contaminated with human waste. The high water table has also pushed the tanks out of the ground, cracking them and resulting in them having to be pumped clean on a weekly basis to avoid groundwater contamination. Eventually, portable toilets were resorted to (Ewing, 2016), which are still being used at the time of writing.

The official opening of the NHC was in November 2014, once everyone had had the chance to settle into their place in the new building. Some local groups were accommodated in a double-storey section with an access balcony, which defined a courtyard behind the hall. The NHC has the appearance of a permanent building, and on the inside the boundaries between the shipping containers and the sandbag construction tend to disappear. As such, the NHC is the start of a public node in Lotus Park. Where the walkway that forms the central spine of the settlement meets the road that leads from Lotus Park to Nyanga Junction station, a brickwork signpost column was built to mark the entrance of the settlement. A portion of the walkway was paved and the NHC was painted with bold graphics – including the name of the settlement – so as to improve spatial legibility (Ewing, 2016).

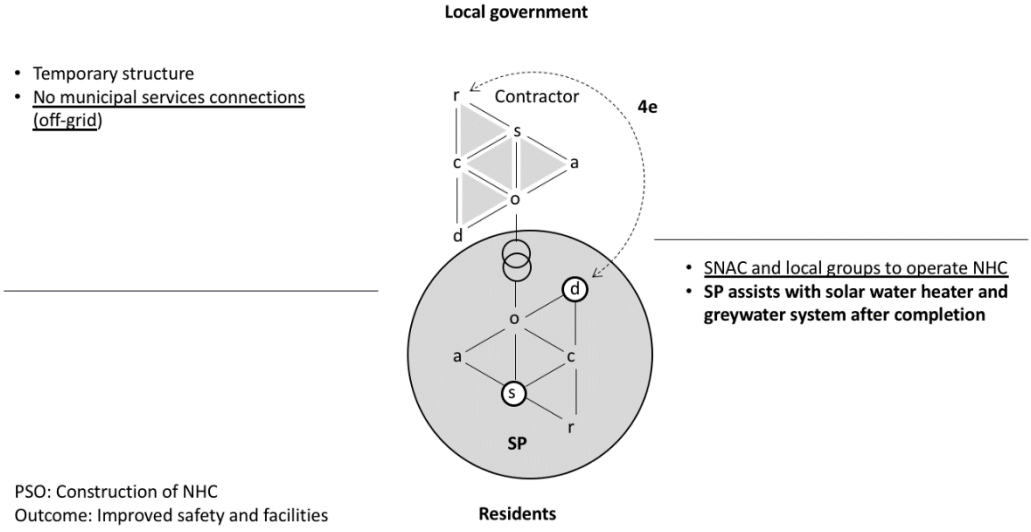

Figure 5.25 Knot LTP3f: SP assists with the solar water heater and greywater system after completion of the NHC. Diagram by author

The subsequent development of the NHC precinct entails the development of public spaces associated with the building, which are being implemented in phases to allow for consultation with the SNAC and local groups, These spaces include an *emthonjeni* (a multifunctional space with a selection of utilities, e.g. water points for washing clothes) and places to gather, play, and conduct business (VPUU, 2014b: n.p). There is also a hard court with floodlights and brickwork seating along the one side of the NHC. After consultation with local groups, the hard court was painted with lines for soccer, basketball, and netball. A netball league now operates from the hard court, and for VPUU it is a major accomplishment to have helped to create a "key public space which is dominated by young women at six o'clock at night" (Ewing, 2016).

5.3.2.2 Spatial intervention

During April 2016, VPUU and DBRS commenced with a live project to design and build a spatial intervention at the NHC, which started with a site visit and guided walkabout (Figure 5.26). The nature of the spatial intervention was to be determined in collaboration with the SNAC, and would aim to introduce useful functions into the public space surrounding the NHC. KE described the history of VPUU's involvement in Lotus Park to the 40 B.Tech. (Architectural Technology) students who took part in the live project, drawing their attention to the importance of being respectful and gentle towards the residents who volunteered to take part in the live project, as the latter group was not used to working with architectural professionals. Both KE and SP noted that working with the SNAC and resident volunteers would be subject to contingency: they volunteer their time and as such – due to their own competing priorities – their availability is difficult to predict. In addition to this, the community facilitator in the Community Participation Workstream (MP) was on maternity leave. Her absence compromised the liaison with both the SNAC and resident volunteers, with the result that the group included only one member of the SNAC (a fact that would later become problematic). The volunteers further included representatives of the community register office and the neighbourhood watch, including a safety promoter in the Social Crime Prevention Workstream (AM). During the guided walkabout, SP sensitised the students to the fact that they were walking through a neighbourhood, and that they should ask for permission before taking photographs of people and their dwellings. Students were also asked to be discreet about the purpose of their visit, so as not to raise any unrealistic expectations regarding further settlement upgrading or the provision of formal dwellings. After the walkabout, the students were divided into six groups and introduced to the resident volunteers, one of which was assigned to collaborate with each group.

Three sites for possible intervention were identified and a specific site was to be decided on by the groups after the walkabout and initial consultation. As the owner of the scrapyard had a strained relationship with VPUU, the intent was to introduce a neutral intervention that did not problematise the situation further. Due to the time constraints of the live project, this ruled out one of the sites that was initially identified, i.e. the one between the paved walkway and the scrapyard. VPUU saw the NHC intervention as the start of a negotiation for future of the precinct, premised on a strategy of piecemeal interventions that slowly creep into contested

Figure 5.26 The site visit at the NHC (top) and guided walkabout through the Lotus Park informal settlement (bottom) at the start of the live project
Photographs: DBRS, 2016

spaces such as the tent church and scrapyard. The two remaining sites were on either side of the hard court, one in front of the ECD facility and one adjacent to the brickwork seating along the one side of the NHC. Based on site analyses undertaken at the NHC after the walkabout, as well as on discussions with the resident volunteers, each group then proposed possible spatial interventions on the two remaining sites, all of which aimed to introduce useful functions into the public space surrounding the NHC.

The planning for the concept design process allowed for four weeks. During the first two weeks of the live project, the spatial interventions were developed collaboratively in groups consisting of students and resident volunteers, working both at the NHC and at the DBRS studio. Upon completion of the concept designs, each group presented their proposed spatial interventions to the resident volunteers at the NHC during the last week of April 2016 (Figure 5.27). Unfortunately, due to MP being on maternity leave, very few people outside of the volunteer group were aware of this presentation and only one member of the SNAC attended. During the first week of May, the nodal coordinator for Lotus Park (MS), SP, and I reviewed the concept designs together with the resident volunteers for a second time (Figure 5.28). The majority of the proposed interventions entailed covered seats adjacent to the hard court, with some of the interventions proposing a link to the *emthonjeni* behind the NHC. One proposal was disqualified immediately based on available funds. Two others that entailed the removal of existing infrastructure or changes to the NHC were also ruled out due to time constraints. It became clear that despite voicing their opinions about the individual proposals – and the discussion taking place in isiXhosa (translated for MS, SP, and myself) – the resident volunteers lacked the confidence to identify and justify their preference regarding the remaining options. This resulted in a secondary contradiction between a residents' rule (locally owned co-design process) and their division of labour (volunteers unable to identify and justify preferred design) (LTP4a). Knotworking led to a vote to indicate the preferred design (**residents' artefact**) (LTP4b).

The selected design (Figure 5.29) was then developed further by a group of 12 students, with the support of their part-time construction technology lecturer (WB) and a structural engineer (MC), who assisted us on a *pro bono* basis. As construction was due to commence during the last week of May, the design of the steel brackets and reinforcement bars had to be finalised urgently in order to allow sufficient time for manufacturing and galvanising. A specialist subcontractor who WB had previously employed to manufacture the structural steel components of the MyCiti bus stations in Cape Town were to manufacture the steel brackets, and one of the subcontractor's suppliers offered to galvanise the brackets free of charge. A couple of days before construction was to commence, we received an email from KE reporting that the proposed intervention had been discussed at the SNAC's weekly meeting. As only one member of the SNAC had attended had the concept design presentation – despite having been invited by both SP and the resident volunteers, in the absence of MP, who would normally facilitate such community participation – they felt that they had not been sufficiently consulted in the design process and were concerned about the form and function of the intervention. This resulted in a secondary contradiction between a residents' rule (SNAC must be consulted during

Figure 5.27 Each group of students presented their proposed spatial intervention to the resident volunteers at the NHC. Photograph: DBRS, 2016

Figure 5.28 Review of the concept design proposals by the resident volunteers Photograph: DBRS, 2016

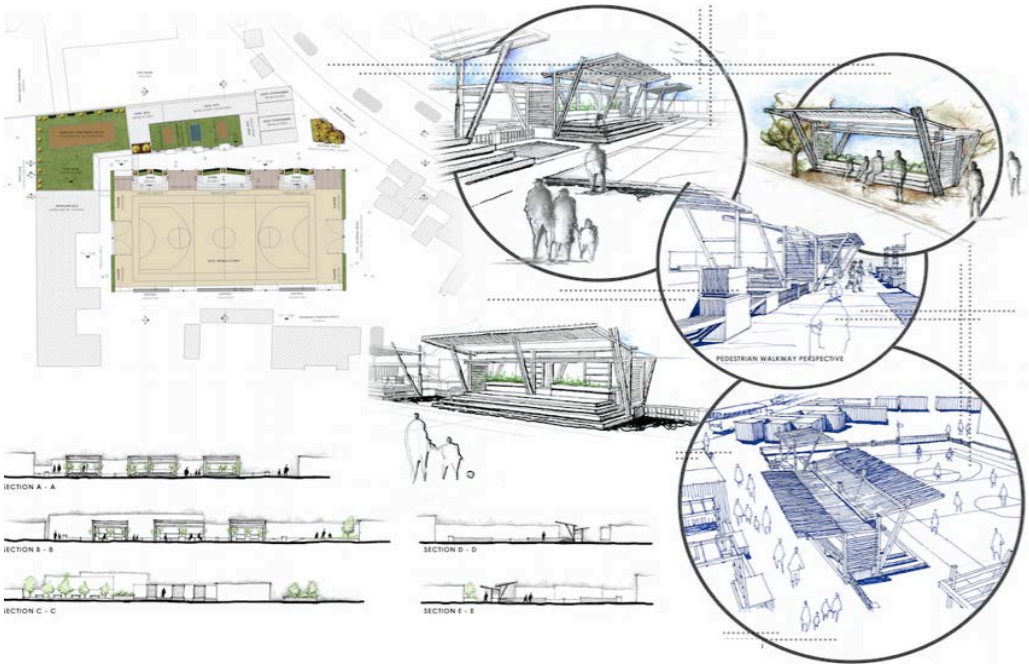

Figure 5.29 Selected concept design for the spatial intervention at the NHC
Photograph: DBRS, 2016

Figure 5.30 Revised computer rendering of the selected design for the spatial intervention
Photograph: DBRS, 2016

co-design process) and their division of labour (MP unable to liaise with SNAC during co-design process) (LTP3c). The SNAC's concerns were, in part, due to a misinterpretation of computer renderings left pinned up in the NHC hall after the concept design review. Their main concern was that the structure needed to be more engaging for both young children and teenagers. An isiXhosa-speaking student and I attended the SNAC's next weekly meeting on behalf of the DBRS, and clarified the design using a cardboard model and revised computer renderings (Figure 5.30). The addition of grab bars and a tyre wall was proposed during the meeting, so that the structure could function as seating, an outdoor gym, and a play space. The knotworking that resolved the SNAC's concerns involved our attendance of the meeting, the student's language skills, and the revised computer rendering and cardboard model (**residents' subject, division of labour,** and **artefacts**) (LTP4d, see Figure 5.31).

Resolving the concerns raised by the SNAC had postponed the commencement of construction by one week. As only two weeks were set aside for construction in the project timeline, the time available to complete the spatial intervention was reduced by half. However, as the construction work was to take place in two groups working at the same time – six students working on site under supervision of a local contractor (AJ), doing excavations and preparing for the concrete to be cast (Figure 5.32), and six other students working in an off-site workshop to prepare and test assemble the timber frame structure (Figure 5.33) – it was decided to attempt to complete the entire project in one week. Nonetheless, our progress was slower than expected due to the risk of theft on site (meaning that everything had to be packed away each evening) and cumbersome procurement processes at both VPUU and DBRS, which resulted in a delay in the delivery of construction material. However, the delays allowed more time for planning, which

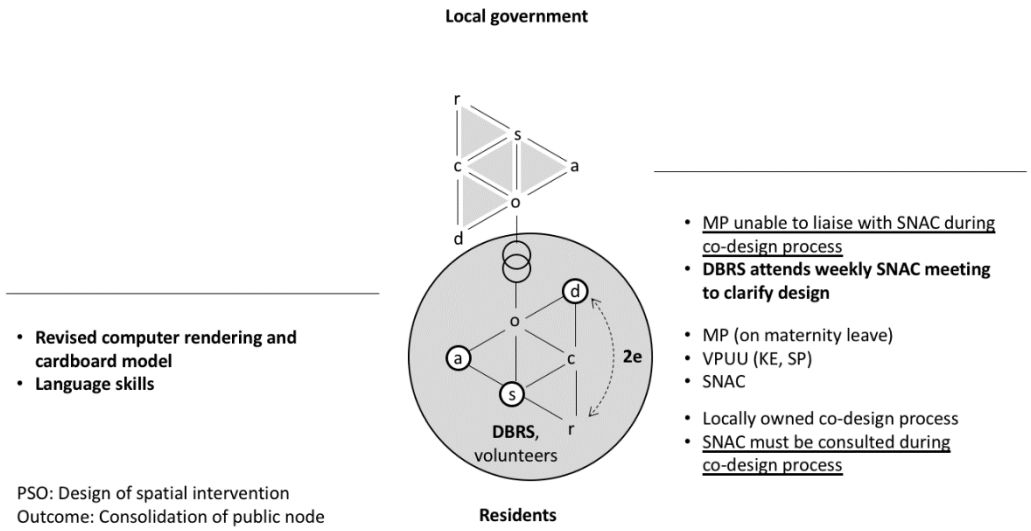

Figure 5.31 Knot LTP4d: DBRS addresses SNAC's concerns regarding the form and function of the proposed spatial intervention. Diagram by author

Figure 5.32 Assembling the reinforcement bars for the stub columns (top); and the newly cast stub columns still in their shuttering (bottom). Photographs: DBRS, 2016

Figure 5.33 Preparation of the timber components at the workshop: sanding (top left) and cutting nail plates to size (top right); and the students who took part in the construction in front of one fully test assembled timber frame (bottom) Photographs: DBRS, 2016

resulted in more efficient work once the material had been delivered. At the end of the week, the concrete work had been completed on site and one bay of the timber frame structure had been test assembled at the workshop. However, there was not sufficient time to erect the timber structure on site, and the project was put on hold until such time as student volunteers were available to take part in the completion of the intervention. AJ completed the construction of the brickwork seats and concrete footings onto which the timber frames were to be bolted at the start of August 2016. By this time, the components of the timber frames (which were disassembled after test assembly at the workshop) had also been delivered to the NHC, and stored in a shipping container adjacent to the site.

Student volunteers were requested to assist with the assembly and erection of the timber frames during the one week university recess in September, but eventually only four of the students who volunteered were able to assist (and only for two days). In the week after the recess, 12 second year Interior Design students were assigned to assist with the project, and by the end of the week we had managed to assemble all four of the timber frames, which were then stored in the courtyard of the NHC (Figure 5.34). As this posed a safety risk to the children using the ECD facility in the courtyard, this was a less than ideal situation. AJ and I had also measured out and installed the threaded rods onto which the timber frames would be bolted into the concrete bases. This proved a challenging task, as the concrete work was not of a very high quality; AJ had only ever cast concrete for foundations before, which required a much lower quality of concrete. At this stage, the project met its biggest challenge yet, as none of the construction rental companies we approached were willing to provide scaffolding for a project in an informal settlement, due to the risk of theft. As DBRS could not commit any more of our students' time to the project, AJ would have to complete the project on his own, and he was unwilling to take on such a complex task alone.

During mid-October, WB asked RH (a plant manager at a national construction company) if they could assist with the erection of the timber frames and the installation of the roof sheeting on a *pro bono* basis. A month later, RH confirmed that they would assist and that they would provide one of their construction teams, scaffolding, and a crane truck. They were also willing to include four local workers (sourced by VPUU) in the team, so as to ensure local ownership of the process. At the end of November, when RH commenced with the fitting of the frames onto the threaded rods that AJ had cast into the concrete bases, it became clear that the majority of them were misaligned with the openings in the steel brackets that were to join the frames to the threaded rods. The misalignment of the threaded rods with the openings in the steel brackets – as well as the builders' recess during December 2016 and January 2017 – brought the project to a halt. This situation was further complicated by the dissatisfaction of the SNAC with the timber frames that had now been stored in the NHC courtyard for four months, as well as the fact that the shipping container where the construction material was stored had to be vacated. New brackets were designed in collaboration with WB and MC during February, and RH had these manufactured and galvanised by one of his subcontractors. This resulted in a substantial delay, and by May KE requested that RH provide a timeline for the completion of the

project. The timeline was provided by mid-May, but on the first day of subsequent work it became clear that the concrete bases had to be recast, as the quality of the concrete work was unacceptable. RH undertook this work, which resulted in a two-week delay. After the concrete based had been recast, RH had to attend to work elsewhere and was unable to commence with the outstanding work at the NHC. Two weeks after the concrete based had been recast, KE again requested a timeline for the completion of the work, with the understanding that VPUU would proceed to complete the work with a different contractor if it was not completed by the end of June.

During the last week of June, RH had his rigging team and crane truck on site to install the four timber frames. As they were fixing the last frame to its base, the team was confronted by a taxi driver whose way was blocked by the crane truck. The taxi driver left and returned with a couple more taxi drivers who threatened to set the crane truck alight if it was not moved immediately (despite the fourth frame still being suspended in mid-air). After some negotiation, the team was able to complete the installation of the fourth frame and leave the site unharmed (Figure 5.35). RH then obtained a quotation from a local roofing subcontractor to complete the installation. This was done by the end of July (Figure 5.36), after which the VPUU BEW arranged for a new contactor employed by VPUU to install the last bracing timbers, thereby completing the spatial intervention and concluding the live project.

Figure 5.34 Student volunteers assembling the timber frames, which were stored in the courtyard of the NHC afterwards. Photograph: DBRS, 2016

Figure 5.35 The timber frames in position, with temporary bracing timbers while awaiting installation of the roof timbers. Photograph: DBRS, 2017

Figure 5.36 The completed spatial intervention in its context, prior to the installation of the bracing timbers and tyre wall. Photograph: DBRS, 2017

5.4 Sweet Home Farm process house and typology adaptation

5.4.1 Background and selection rationale

The third live project that informs the research reported on in this dissertation was undertaken during 2017 in collaboration with UBU and the resident leadership of Sweet Home Farm, Philippi. A proposal for the adaptation of a self-build dwelling prototype (the latter developed by UBU and the resident leadership) into a more appropriate form of emergency housing informed the live project, which entailed the adaptation of the dwelling prototype for use as a clinic.

5.4.1.1 Ubuhle Bakha Ubuhle (UBU)

The Workshop, a faith-based NGO, has been undertaking social development work in Sweet Home Farm since 2005, and has established a senior citizen's club, a HIV support group, a soup kitchen, and a soccer team. The relationships that were built and fostered through this work culminated in the establishment of Ubuhle Bakha Ubuhle (UBU). The latter organisation was founded by an architect from the United Kingdom (BL, Table 5.5), who did volunteer work at The Workshop during visits to South Africa (UBU, 2017d). When BL moved to Cape Town in 2009, he started working together with a resident leader in Sweet Home Farm (SJ) to facilitate the improvement of living conditions in their settlement. When the COCT announced its plans for an UISP project in Sweet Home Farm, BL realised that for the project to be successful, residents would have to be capacitated to contribute meaningfully to the development process. In order to support this capacity building, he founded UBU towards the middle of 2012. UBU's philosophy centres on (i) the provision of innovation around housing challenges by "activating, inspiring and working with local communities, in partnership with other parties such as local government, NGOs, commercial

Table 5.5 Role players in the Sweet Home Farm case study
Table by author

Role players in the Sweet Home Farm case study	
Initials	**Role**
BL	Architect, UBU
DM	Architect, UBU
GM	Official, COCT UISD
NJ	Member, UBU
NP	Resident, SHF
SJ	Resident leader, SHF
WA	Official and engineer, COCT UISD

entities and individuals", and (ii) capacity building "in order to increase the sustainability and financial feasibility on a project-level whilst affirming the intrinsic value and agency of the people within the community" (Du Preez, 2017: 13). As such, UBU works to enable a process of facilitated building, where informal settlement residents themselves – the true experts in incremental upgrading – are trained as builders so that they can play an active role in the construction phase of the UISP project by implementing contextually appropriate, self-build technology. Such technologies are premised on on-site manufacturing of composite structural components, rather than the purchase of patented products manufactured elsewhere (UBU, 2017d). Besides BL, UBU has two other members: SJ's wife (NJ), who leads the savings scheme initiative in Sweet Home Farm, and an architect from Scotland (DM).

UBU structures its work around two themes, namely facilitation and building. UBU Facilitate "starts a process of listening, talking, dreaming, capturing ideas and gauging the way forward for the incremental building projects and transformation of the community", and employs a set of established stages: preparing for a project with residents, capturing demographic data, initiating a project steering committee (PSC), facilitating participatory planning processes, and establishing housing support centres. At present, as part of the professional resource team (PRT) appointed by the COCT, UBU acts as a facilitator in the UISP project in Sweet Home Farm. UBU Build provides architectural and construction skills to ensure that the most appropriate designs, materials, and plans are used. UBU has chosen to use a system of corrugated steel sheeting supported on on-site manufactured composite timber batten and steel lattice structural components (similar to the patented Ecobeam structural components employed in the construction of the NHC at Lotus Park), which are then filled in with sandbags from the inside of the structure while it is occupied. Upon completion of the sandbag infill, the sheeting can be removed and both the interior and exterior of the wall can be plastered. The benefits of this system includes its cost-effectiveness, the fact that it can be built incrementally in conjunction with a savings scheme, good thermal and acoustic performance (once the sandbag infill is complete), and the fact that the wall is bulletproof (UBU, 2017d).

5.4.1.2 Sweet Home Farm

The SHF informal settlement was established in 1992, when a group of families moved onto what was then an illegal rubble and refuse dump on underutilised farmland, owned in part by the COCT. The families supported their livelihoods by recycling dumped bricks and other material from the site and selling this on the roadside. The settlement is well located in terms of employment, both on farms in the Philippi horticultural area and in nearby industrial areas. As a result, the settlement grew quickly and between 1996 and 2003, the number of households increased from under 400 to over 2000. In 2006, in response to calls by the resident leadership, the COCT did a partial reblocking on the portion of Sweet Home Farm owned by them, dividing the settlement into smaller sections by means of service roads and providing electrical connections as well as a rudimentary open-air sewage system (Figure 5.37). However, the closed corporation that owned the remainder of Sweet Home Farm refused to allow the COCT to install any services on their portion of the land (Sacks, 2012: n.p.).

Figure 5.37 The development of Sweet Home Farm between 2003 and 2012
Photographs: Google Earth, 2017

5.4.1.3 Selection rationale

From the onset, the work that UBU has undertaken at Sweet Home Farm was based on the idea of "activating what already exists" through capacitation and empowerment, as well as by building partnerships with all parties that have a vested interest in enabling sustainable and holistic change in the settlement (UBU, 2012: 15). UBU draws attention to the knowledge embedded within the resident leadership and local groups, and aim to activate such knowledge by means of facilitated participatory planning and facilitated self-build projects. In advocating for the recognition of residents' right to the city, they draw attention to the importance of the idea of building a home, extending beyond a dwelling to encompass a "place in the rooted city", and in doing so to protest against the transience that informal settlement residents are subjected to. In facilitating the preparation for the UISP project in Sweet Home Farm, UBU invited residents (through membership of the PSC as well as in a number of general meetings) to contribute to the design of the upgraded settlement (UBU, 2017d). It is during one of the first of these general meetings that a young female resident (NP) suggested a dwelling typology – based on the dimensions of a RDP subsidy house, turned onto its side – that became the basis for the dwelling prototype that is discussed in this case study (UBU, 2016b) (Figure 5.38).

Figure 5.38 NP uses wooden blocks to represent the size and format of the alternative dwelling typology. Photograph: UBU, 2016b

5.4.2 Descriptive narrative and mapping

5.4.2.1 Process house

The dwelling prototype referred to above was developed in conjunction with the planning for the UISP project, and was eventually constructed in Sweet Home Farm as the 'process house'. At the beginning of 2011, SJ was elected as chairman of the resident leadership and initiated an engagement with the COCT to facilitate the upgrading of their settlement. However, during a meeting with the resident leadership a year later, the local ward councillor confirmed that the COCT had not yet allocated a budget for the *in situ* upgrading of the settlement. This resulted in a secondary contradiction between the local government division of labour (COCT to facilitate settlement upgrading) and the PSO (upgrading of settlement) (SHF1a). Part of the reason for the delay in the upgrading of the settlement was the fact that the COCT did not own all the land on which the settlement was located. This resulted in another secondary contradiction, this time between the local government division of labour (again, COCT to facilitate settlement upgrading) and one of its rules (COCT can only upgrade settlement if it owns all the land the settlement is located on) (SHF1b). In response to the ward councillor's confirmation that no budget had been allocated for an UISP project, residents undertook violent protest action during March 2012 to express their frustration with the COCT's lack of action w.r.t. their requests for the upgrading of their settlement (Du Preez, 2017: 8).

The violent protest contributed to the knotworking that resolved the first contradiction (SHF1a) in that, soon after the protest action, SJ was invited to meet with the mayor of Cape Town. As such, the knotworking entailed the **residents' subject** (SJ), the violent protest action as a **residents' artefact**, and both the **residents' rules** (violent protest action required in order to gain attention of COCT) and their **division of labour** (SJ invited to meet with the mayor) (SHF1c). During SJ's meeting with the mayor, she confirmed that the COCT had recently purchased the portion of Sweet Home Farm owned by the closed corporation and that the upgrading – in the form of an UISP project – could proceed (UBU, 2017d) As such, the budget used to purchase the remaining land from the closed corporation and the UISP project are both **local government artefacts** (SHF1d, see Figure 5.39) that contributed to the knotworking that resolved the second contradiction (SHF1b). This knotworking pertains to GAP by virtue of the architectural nature of the UISP project, which was to include the development of dwelling prototypes. In July 2012, as a precursor to the UISP project that had still not commenced, UBU conducted an upgrading feasibility study for a section of the settlement that was bounded by a road on all sides. The section was home to 50 households, and a survey was conducted to gather baseline information relating to the size of each household and their dwelling. This information was combined into a diagram that highlighted the key factors that would influence any future spatial arrangement of the section (UBU, 2012: 4-6) (Figure 5.40). The survey and diagram enabled UBU to propose a development model for upgrading, based on seven principles (UBU, 2012: 7-8):

- Community involvement, both in terms of contributing to the cost of upgrading as well as contributing their labour to the building of their new dwellings. This would enable the development of a sense of ownership, while reducing construction costs.

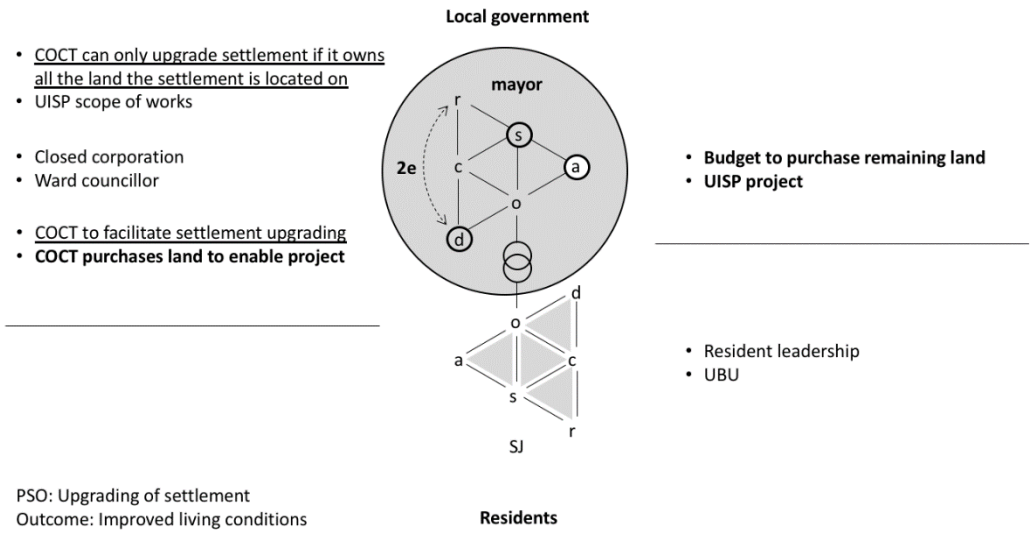

Figure 5.39 Knot SHF1d. The COCT employs its budget as an artefact to address the contradiction w.r.t. land ownership, so as to enable the commencement of an UISP project. Diagram by author

- Local government involvement, with the COCT providing drainage infrastructure as well as the foundations for the dwellings, thereby enabling residents to take the construction process further by themselves.

- Efficiency and density, thereby respecting and sustaining the social capital in the settlement by striving to retain the maximum number of residents after upgrading. This necessitates a mix of semi-detached dwelling typologies, both single and double-storey, so as to achieve sufficient density.

- Space and clustering, entailing the organisation of dwellings into small groups, where residents would work together on shared party walls and the simultaneous construction of their dwellings. This would allow incremental upgrading where clusters are developed as sufficient funds have been saved by groups of households.

- Material selection, based on the most cost-effective and sustainable technologies. This would entail timber structural components (similar to the Ecobeam components used for the Lotus Park NHC, but manufactured on-site by Sweet Home Farm residents) with sandbag wall infill that could be covered by corrugated steel sheeting, or plastered and painted. This technology provides a wall that is waterproof, fireproof, and bulletproof; fast and easy to construct; and has good thermal, acoustic, and climate control properties. This technology has subsequently obtained the international Agrément certification, which enables dwellings to receive approval from the National Home Builders Registration Council (NHBRC).

- Combined financing, with the COCT providing drainage infrastructure and the foundation for each dwelling, residents contributing through group savings schemes, and external financial input from commercial interests that stand to benefit from the upgrading (e.g. small businesses that would rent units constructed by residents).

- Decant spaces, enabling residents to move out of their dwellings for the short period during which their new dwellings are built. It is crucial that such spaces are in the settlement itself so as not to disrupt residents' livelihoods.

These principles informed the development of a proposed site layout (Figure 5.41) that indicated the clustering of dwellings, and how this dwelling typology would allow for incremental upgrading of the section. However, when the proposed site layout and accompanying clustered dwelling typology was presented to the resident leadership at a general meeting during November 2012, it was immediately rejected. The most prominent concern was about the two-storey walk-up design of the proposed typology, as second-storey dwellings (i.e. those without a ground floor and direct access to the outside) would compromise a number of cultural practices[8]. As such, this

[8] Specifically relating to the treatment of the remains of the recently deceased, whose caskets remain at the family dwelling prior to burial.

Figure 5.40 Key factors pertaining to the upgrading feasibility of one section of Sweet Home Farm. Drawing: UBU (2012: 6)

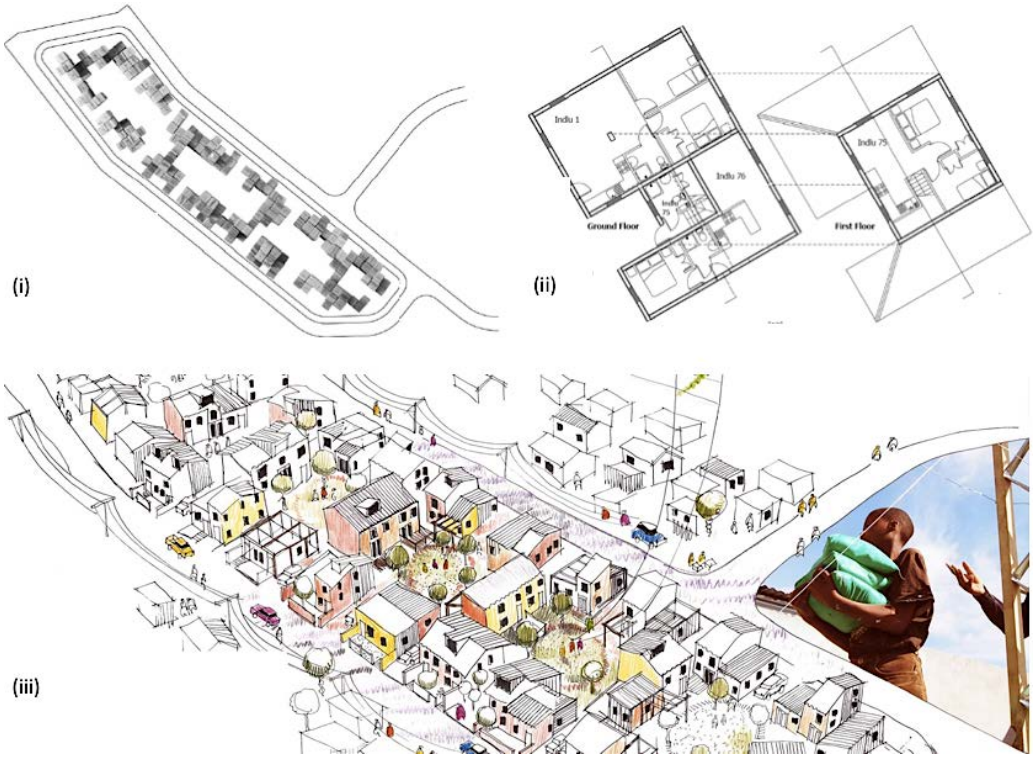

Figure 5.41 The (i) site layout concept, (ii) individual dwelling layouts, and (iii) a perspective drawing of the proposed upgrading. Drawings: UBU (2012: 9; 12-13)

rejection was the result of a primary contradiction within the residents' rules (two-storey walk-up typology vs. cultural practices) (SHF2a). The resident leadership's decision that a standard size typology must be employed so as to address concerns relating to equity in terms of dwelling unit size (Lewis, 2017a), resulted in another primary contradiction with the resident's rules (two-storey walk-up typology vs. standard-size typology) (SHF2b). It was then that NP proposed an alternative dwelling typology, by taking the four wooden blocks used to represent the size and format of a RDP subsidy house, and turning them on their side to become a double-storey dwelling. This typology eliminated the need for expensive fire-resistant party floors between dwelling units, while the sandbag wall technology proposed by UBU (despite initial resistance) addressed concerns relating to party walls and acoustic privacy. UBU then undertook to further develop the typology proposed by NP by defining the dimensions of the structural components for the walls, suspended floor, and roof. These components were to be designed to allow the typology to function initially as a single-storey dwelling that can be converted to a double storey at a later stage as household finances allow (UBU, 2016a). In proposing a new typology, NP contributed to knotworking that resolved both primary contradictions that emerged during the meeting by tying together a **residents' artefact** (alternative dwelling typology), a member of the **residents' community** (herself), and two aspects of the **residents' division of labour** (NP takes ownership of co-design process and proposes alternative typology, and UBU to refine and develop alternative typology) (SHF2c, see Figure 5.42).

During 2013, the COCT had purchased a portion of industrial land adjacent to Sweet Home Farm for use as an IDA (a space where residents could move to temporarily while their section of the settlement was being upgraded). After the warehouses on this portion of land were demolished and services infrastructure was installed, the UISP project was able to commence in early 2014 with the appointment of a PRT (Moyo, 2017). A consulting engineering firm and an architecture and planning firm were appointed to lead the PRT, and their scope of works included the following activities: (i) establishing a conceptual development framework; (ii) project facilitation and participatory planning; (iii) preparing environmental, heritage, and other statutory applications; (iv) a cadastral and topographical survey; (v) detail design and costing of basic service infrastructure; as well as (vi) construction, tender, monitoring, and site supervision. The two firms that led the PRT appointed UBU to coordinate and implement the social facilitation and participatory planning aspects of the project in collaboration with the resident leadership. As such, UBU played the crucial role of intermediary between local government (COCT), the PRT, and the resident leadership that comprised the PSC. In fulfilling this role, they coordinated the incremental, participatory process and facilitated capacity building opportunities for residents (Du Preez, 2017: 13).

As part of their intermediary role in the UISP project, UBU continued with the development of the dwelling typology that NP had proposed in November 2012. The UISD official tasked with the preparation for the UISP project (GM) encouraged UBU to construct a prototype of the dwelling typology. This typology would serve to elucidate the process of building one's own dwelling incrementally, and as such it became known as the 'process house'. When the 'Better

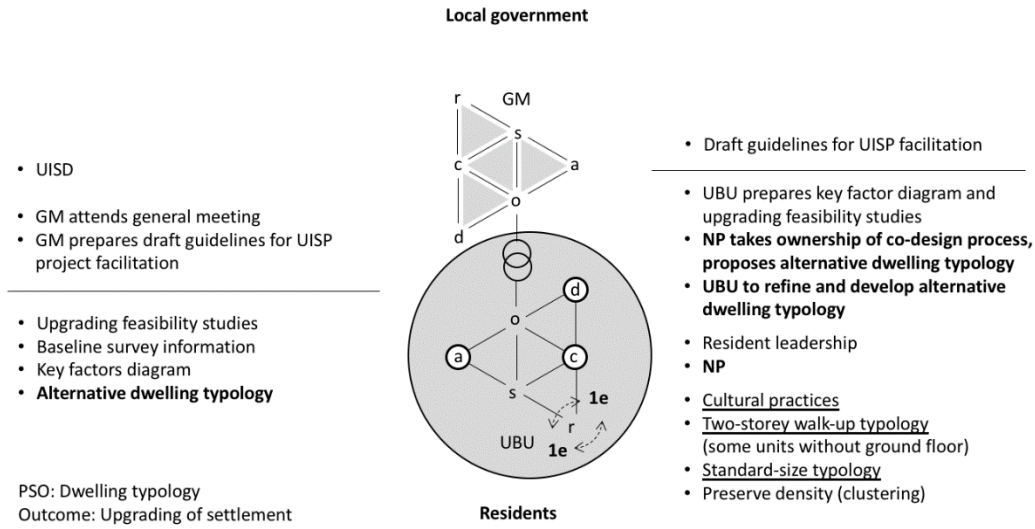

Figure 5.42 Knot SHF2c. NP takes ownership of the co-design process and proposes an alternative dwelling typology. Diagram by author

Living Challenge' (BLC) was launched in late 2013, GM insisted that UBU "put their money where their mouths are" and enter the dwelling prototype in the competition (CCDI, 2016). However, UBU did not have sufficient funding to finance the construction of the process house. This contradiction, between the PSO (constructing the process house) and the residents' artefacts (lack of funding to develop prototype) (SHF3a), was resolved when UBU received a donation of ZAR 50 000 in order for them to construct a full-scale prototype of the dwelling typology as their BLC entry. This knotworking involved **artefacts** in both of the activity systems: the BLC (**local government**) and the ZAR 50 000 donation (**residents**) (SHF3b, see Figure 5.43). UBU also developed an infographic that represented the construction sequence of the prototype to accompany their entry (Figure 5.44).

The social facilitation and participatory planning undertaken by UBU as part of the UISP project included a household enumeration that involved more than 2 000 households, and by March 2014 the results had been collated into a comprehensive database that would inform the spatial reconfiguration of the settlement (Du Preez, 2017: 15). The spatial reconfiguration would be facilitated by the creation of two plans: a superblock plan and a subdivision plan. The superblock plan formed a basic skeleton plan for the settlement and included non-negotiable aspects such as the settlement boundary, existing roadways, access points, existing electrical infrastructure, and the IDA site; as well as aspects that could be negotiated, including the location of shared facilities, internal streets, open space, and housing. UBU assisted the PSC in developing an understanding of the settlement density and the implications of different dwelling typologies, and facilitated a general meeting during September 2014 where the PSC presented the superblock plan to the residents of Sweet Home Farm. During a second general meeting two months later, the resident leadership accepted the principles embedded in the superblock plan.

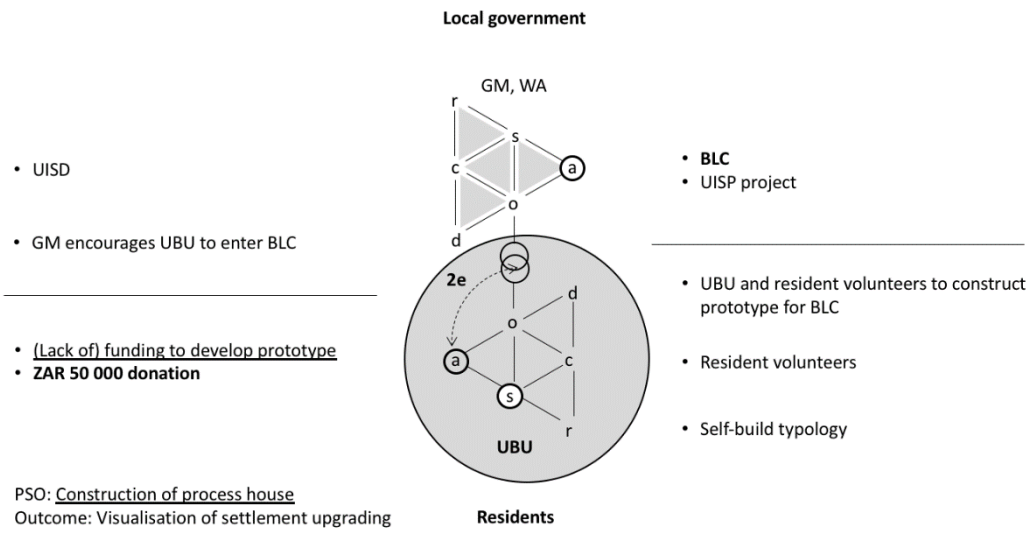

Figure 5.43 Knot SHF3b. The BLC and a ZAR 50 000 donation enabled UBU to construct a full-scale prototype of the dwelling typology. Diagram by author

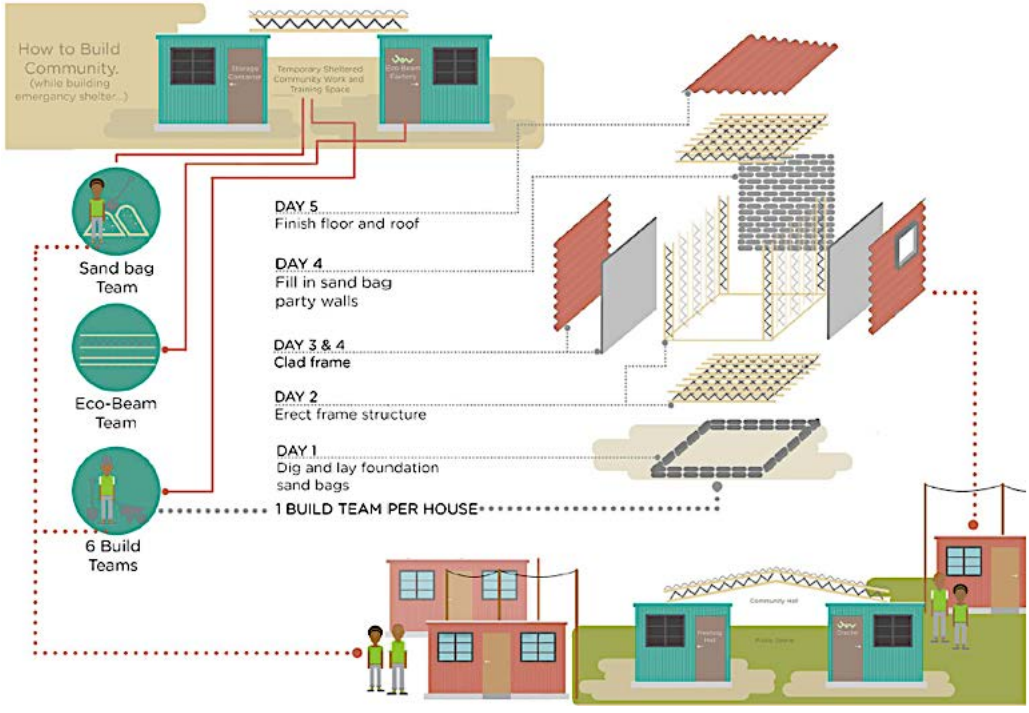

Figure 5.44 Construction sequence infographic prepared by UBU for their BLC entry Drawing: UBU, 2016b

During October 2014, in the week prior to the exhibition of the BLC entries, UBU had the timber structural components manufactured by resident volunteers. The making of these frames, as well as their assembly and cladding to form the structure of the full-scale prototype at the station forecourt, took three days. During the exhibition, female resident volunteers made and filled the sandbags in the prototype. Despite BL's concerns that the resident volunteers – upon experiencing the prototype at full-scale – would reject the construction technology, they appreciated the solidity of the sandbag walls and the potential that these held for incremental upgrading (Lewis, 2017a). The BLC provided an opportunity to refine the dwelling typology for incremental construction, and this resulted in an adaptation of the construction sequence: instead of building the sandbag infill walls at the onset, the timber structural frame would only be clad with corrugated steel sheeting. This would provide a weather-proof shelter, that residents could then complete by building the sandbag infill wall from the inside, as their time and budget allow. Once the sandbag infill wall is complete, a concrete ring beam and corner columns are cast, after which the interior walls (and exterior walls, if desired) can be plastered and painted (CCDI, 2016). This led to the realisation that the construction of the process house at Sweet Home Farm is crucial to assist residents to visualise the outcome of the UISP project that was unfolding at that time.

After being approved by the resident leadership, the superblock plan was submitted to the COCT Spatial Planning and Urban Development Department (SPUDD) for formal approval in February 2015. After this submission, UBU and the PSC conducted a three-month-long co-design exercise where residents of each of the five sections identified in the superblock plan met to plan the layout of their particular section, so as to inform the subdivision plan. This process was informed by horizontal learning exchanges that entailed visits to other informal settlements that had been upgraded, and culminated in the submission of a subdivision plan to the SPUDD during July 2015 (Du Preez, 2017: 16; 31). However, the superblock plan and the subdivision plan were met with opposition from the officials at the SPUDD as it deviated from their own guidelines for human settlements. Notwithstanding this, both plans had the full support of the PRT, including the UISD.

After dissembling the BLC prototype, UBU sought to obtain permission from the UISD to construct the process house on a site adjacent to the existing NHC in Sweet Home Farm. The construction of the process house would assist in "holding the space" for the public precinct envisioned in this superblock plan. However, a secondary contradiction arose between the PSO (construction of the process house) and a residents' rule (permission to be obtained prior to construction on site) (SHF3c). Eventually, informal approval for the construction of the process house was received in the form of an email from an engineer at the UISD (WA), who stated that their department would not pursue the demolition of the process house if it were to be constructed at Sweet Home Farm. The UISD did however require that an engineer approve the structural design of the process house prior to construction, which led to another secondary contradiction relating to the PSO (construction of process house) – this time with a local government rule (structural design must be approved by an engineer) (SHF3d). Once again, WA intervened, this time by assisting with the structural design. As such, both of these contradictions were resolved through knotworking by WA, in that he provided informal approval for the construction of the process

house and assisted with its structural design himself (**local government subject** and **division of labour**) (SHF3e, see Figure 5.45). Subsequent to this knotworking, UBU engaged a large, local construction company to sponsor the construction of a concrete raft foundation for the structure (James, 2017; Lewis, 2017a). With the foundation having been cast in May 2015, the reassembly of the structure used for the BLC could commence. The resident volunteers who reassembled the structure were members of the youth soccer club facilitated by BL a few years earlier; and none of them had previous experience of construction (UBU, 2017d).

The construction of the process house – which consisted of two semi-detached dwelling units – was divided into 10 stages (Table 5.6), with one of the two dwellings intended to remain a single-storey structure, without any sandbag infill. The latter was to act as a facilitation tool to illustrate the incremental nature of the construction process (hence the name 'process house'). After three days, the timber frame and corrugated steel sheeting of the single-storey structures had been reassembled (Figure 5.46). NJ and resident volunteers who contributed to a women's saving scheme then made and filled the sandbags. Once the sandbag walls of one of the dwellings had been completed, its roof sheeting was replaced with a suspended timber floor, so that the construction of the second storey could be done (Figure 5.47). Upon completion, the double-storey structure was plastered on the outside and inside, and contained a kitchen, shower room, and upstairs meeting room that can be converted into two bedrooms if the structure is to be used as a dwelling (CCDI, 2016). By virtue of the labour intensive process of filling the sandbags, the construction process doubled as a facilitation process during which residents discussed the design and envisioned themselves upgrading their own dwellings once the UISP project was complete (Du Preez, 2017: 21; UBU, 2017a).

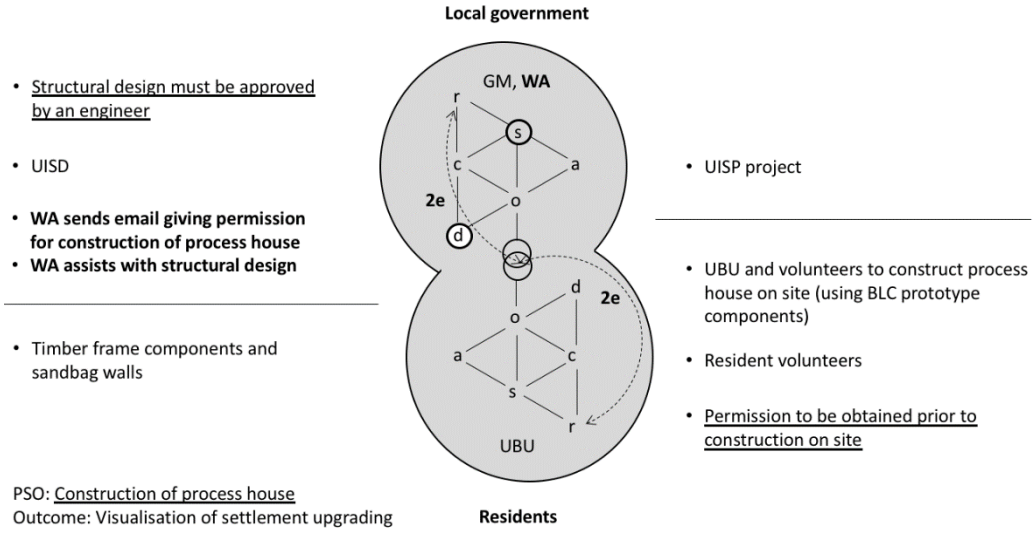

Figure 5.45 Knot SHF3e. WA facilitates the construction of the process house at Sweet Home Farm by providing informal approval and assisting with the structural design thereof. Diagram by author

Table 5.6 The ten construction stages of the process house
Adapted from Du Preez (2017: 22)

The ten construction stages of the process house			
Stage	**Description**	**Stage**	**Description**
1	Preparation and casting of concrete raft foundation.	6	Roof sheeting and trusses are removed to install the first storey base, made of plywood sheeting.
2	Single-level timber frame (similar to the Ecobeam system used at LTP) with roof trusses, fixed to foundation.	7	Second storey timber frame and roof trusses are constructed and covered with corrugated steel sheeting.
3	Timber frame and roof trusses covered with corrugated steel sheeting. The unit now resembles a conventional 'shack' dwelling and is fit for habitation.	8	Polypropylene bags filled with sand are stacked on inside of steel sheeting of first-storey wall.
4	Polypropylene bags filled with sand are stacked on inside of steel sheeting wall (in the depth of the timber frame). Unit is now partially insulated and bullet proof.	9	Plastering of internal walls to first storey.
5	Plastering of internal walls.	10	Removal of steel sheeting on exterior, and plastering of external walls (optional).

The superblock plan was eventually approved in October 2015. This approval was subject to over 60 development conditions, based on the SPUDD's own guidelines for human settlements, many of which were unsuitable for *in situ* upgrading. After imposing these conditions, the SPUDD proceeded to develop their own subdivision plan for Sweet Home Farm, without much regard for the needs and requirements that had been articulated by the PSC in the subdivision plan that they had submitted to the SPUDD four months earlier (and which had the support of the UISD). This resulted in four contradictions: a primary one within the local government community (UISD vs. SPUDD) (SHF4a), a secondary one between the local government subject (PRT) and community (SPUDD) (SHF4b), as well as two quaternary contradictions: one between the rules of the two activity systems (PSC needs and requirements vs. development conditions prescribed by SPUDD) (SHF4c) and one between the artefacts of the two activity systems (PSC subdivision plan vs. SPUDD subdivision plan) (SHF4d). While the subdivision plan had not yet been approved at the time of writing, knotworking by the PRT, PSC, UISD, and SPUDD – in the form of lengthy negotiations – had enabled the implementation of the UISP project to commence in accordance with the superblock plan during April 2017 (UBU, 2017b; UBU, 2017d). As such, this knotworking involved the **subjects** and **division of labour** of both activity systems (SHF4e, see Figure 5.48). This situation is illustrative of the shortcomings in the COCT's implementation of the UISP, due to a lack of well-understood incremental *in situ* settlement upgrading models and supporting technical guidelines to enable the development of innovative models (Du Preez, 2017: 18; Habitat for Humanity SA, 2017: 8).

Figure 5.46 Reassembly of the BLC prototype at Sweet Home Farm: assembling the timber frames (top), and stages 3 to 5 seen from the inside of the dwelling (bottom, from right to left). Photographs: UBU, 2016

Figure 5.47 The process house (centre) seen in its context after completion of the second storey. Photographs: UBU, 2016

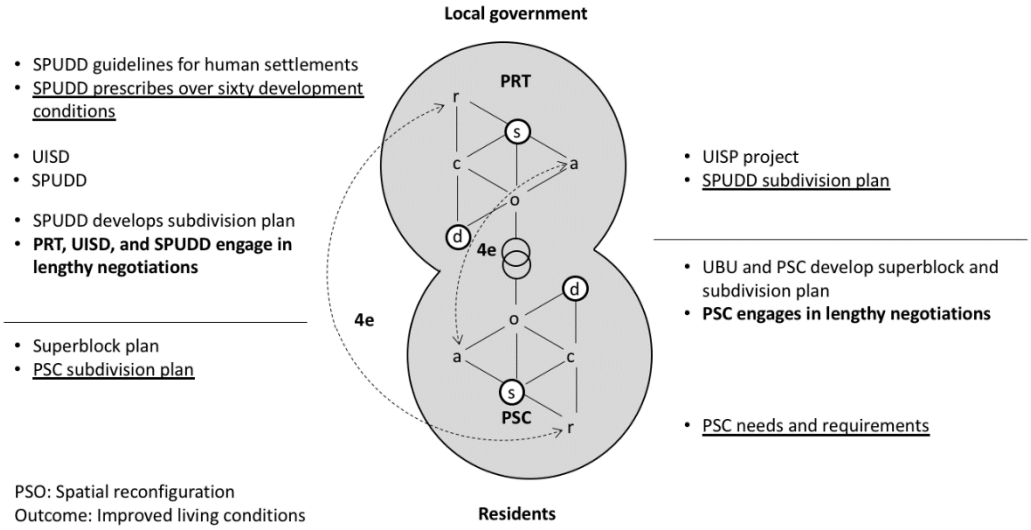

Figure 5.48 Knot SHF4e. Lengthy negotiations between all stakeholders enabled the UISP project to commence according to the superblock plan, in the absence of an approved subdivision plan. Diagram by author

5.4.2.2 Typology adaptation

Towards the end of 2016, UBU submitted a tender to the COCT for ideas on how to undertake emergency housing in a more appropriate manner, based on the prototype that had been tested during the construction of the process house (Figure 5.49). In recognition of the fact that displaced residents remain in emergency housing for extended periods of time – to the extent that more and more tenders for emergency housing entailed the upgrading or replacement of existing emergency housing units – UBU proposed that their typology would allow for the incremental upgrading of emergency housing units into permanent dwellings by residents themselves (UBU, 2017c). UBU and DBRS collaborated on the development of a clinic prototype based on the process house. The collaboration took the form of a live project, and the project briefing took place at the process house so that students could familiarise themselves with the context and the prototype itself (Figure 5.49). As with previous live projects, a co-design process was followed where NJ and other resident volunteers worked together with the students who were developing individual designs based on the process house prototype. At the end of the live project, the students presented their designs to BL, NJ, and other resident volunteers from Sweet Home Farm (Figure 5.50). Nine strong concepts for the adaptation of the prototype to function as a clinic were identified. UBU and DBRS will be engaging in the further development of these in the future.

Figure 5.49 Students in the process house during the live project briefing
Photograph: DBRS, 2017

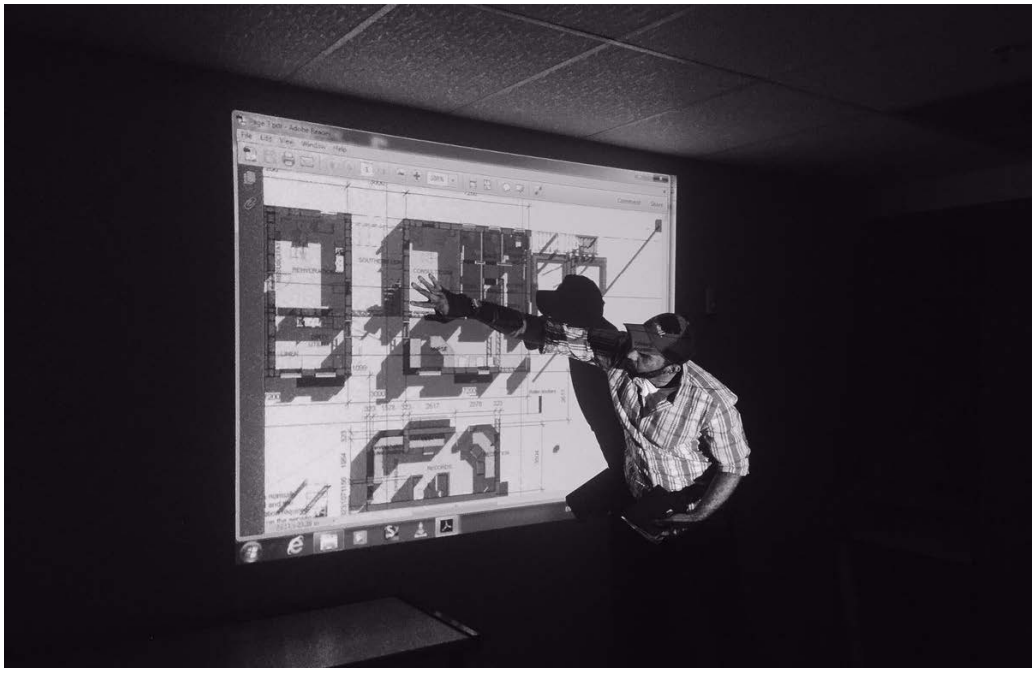

Figure 5.50 Students presented their concept designs of the clinic prototype to resident volunteers. Photograph: DBRS, 2017

5.4.3 Conclusion

In this chapter, I presented the case studies through which I have collected primary data. The latter was achieved by engaging with residents through three live projects undertaken in collaboration with local organisations. Fifteen knots that relate to GAP were identified across the three case studies, and the mapping of these knots was included as figures in the descriptive narrative of the respective case studies. However, in order to realise both the notion of 'in[formal]ity' and the phenomenon of GAP as unit of analysis in the research presented in this dissertation, I need to transcend the mere collation of "idiosyncratic micro examples and case studies" (Pieterse, 2011: 5). This will enable the identification of contextual solutions that work in the present and add up to structural change in the future. In the next chapter, I will do so by using a comparative analysis to develop the insights gained during the mapping of the case studies. The intention of this analysis is to identify patterns that emerge in relation to the nature of GAP as an activity, as well as in relation to the competencies and capacities that are employed in the course of such architectural practice.

Chapter 6

Synthesis

Chapter 6 Synthesis

The overarching aim of the research presented in this dissertation is to explore GAP in transitions to sustainable urbanism in Cape Town. Two of the three subsidiary aims of the research (all of which relate to the MLP) have been addressed in the preceding chapters:

- Aim 1: To explore the regime level by means of a literature review regarding informal settlement upgrading (Chapter 2), a critical appraisal of architectural practice in Cape Town (Section 3.1), and developing a theoretical perspective on 'in[formal]ity' as spatial practice (Section 4.1).

- Aim 2: To explore the niche level by means of a literature review regarding alternative approaches to architectural practice in Cape Town (Section 3.2), introducing AT and GAP as the analytical framework for the research (Section 4.2) and intermediate conceptual tool within the framework of DWR (Section 4.3) respectively, and then concluding with the descriptive narrative and mapping of the three case studies (Chapter 5).

The third aim – to explore the impact of the niche level on the regime level – is addressed in this chapter, which comprises three sections, structured according to the expansive learning process of ascending from the abstract to the concrete (as discussed in subsection 4.2.2). The first section comprises a comparative analysis of the empirical findings of the case studies, with reference to the activity system mapping and the competencies and capacities employed when engaging in GAP, with the latter being understood as a material manifestation of the notion of 'in[formal]ity'. In the second section of this chapter, I discuss the informal capacities employed and developed when engaging in GAP, as these capacities constitute the theoretically mastered solution to the failure of the architectural professional to support and engage with resident-driven initiatives such as reblocking and *in situ* upgrading. In the concluding section, I reflect on the impact of GAP as a niche-level practice on the regime of conventional architectural practice in the context of sustainability transitions and propose further research to continue the trajectory of the research presented in this dissertation.

6.1 Comparative analysis of empirical findings

6.1.1 Activity system mapping

In order to identify the patterns that emerge in relation to GAP and its associated competencies and capacities, I commence this section with a quantitative analysis of the 15 knots pertaining to GAP that were identified in the case studies. This analysis draws attention to particular aspects of the activity system mapping, first in table format and then by means of a reflective discussion on the patterns uncovered in each table. The fold-out diagrams of the 15 GAP knots (Appendix C) provide a visual cross-reference of the tabulated data.

6.1.1.1 Activity system

At the time of most of the knots, the dominant activity system was that of the residents (nine out of 15), followed by the two activity systems being in balance (four out of 15) (as indicated in Table 6.1). This is indicative of the fact that informal spatial practice – as manifested in the residents' activity system – and its associated artefacts, community, rules, and division of labour, inform GAP to a large extent. Conventional architectural practice, on the other hand, is aligned with the structure and formal logic of the local government activity system. As such, many of the capacities that are required to engage effectively with both residents and local government (and in doing so operationalise the notion of 'in[formal]ity') fall outside of the scope

Table 6.1 Dominant activity system at time of knotworking
Table by author

Case	**Knot** Dominant activity system [local government (lg) / residents (r) / in balance (b)]					
LWP lg 0 | r 3 | b 1	LWP1c	LWP2c	LWP3c	LWP4b		
	b	**r**	**r**	**r**		
LTP lg 1 | r 4 | b 1	LTP1c	LTP1e	LTP2e	LTP3d	LTP3f	LTP4d
	r	**r**	**lg**	**b**	**r**	**r**
SHF lg 1 | r 2 | b 2	SHF1d	SHF2c	SHF3b	SHF3e	SHF4e	
	lg	**r**	**r**	**b**	**b**	
If contradictions and knots in one activity system equal more than one third of the total number of contradictions and knots in the two networked activity systems, that is the dominant system. Otherwise, the activity systems are in balance. Highest values in each case are underlined. Dominant activity system is indicated in **bold** type.						

of conventional architectural practice. Of the nine knots where the residents' activity system is dominant, four occur in the LTP case study. This is a result of the COCT appointing VPUU to implement the ISTP at LTP, based on VPUU's participatory approach towards informal settlement upgrading. The same dynamic occurs in three knots in the LWP case, as a result of the COCT partnering with CORC to facilitate the reblocking and upgrading of the settlement. Thus, the involvement of NGOs and their architectural staff facilitates the incorporation of informal spatial practice into upgrading interventions. In the case of SHF, where UBU was involved in the settlement before the commencement of the UISP project to upgrade the settlement, the residents' activity system is dominant in two of the five knots, and as the UISP project neared implementation, the activity systems came into balance. Across the three cases, there are four knots where the activity systems are in balance:

- Knot LWP1c: Both the local government and residents' activity system had a rule that resulted in a contradiction with the local government artefact (conventional settlement layout prepared by BC, an external planning consultant).

- Knot LTP3d: The two activity systems are in balance here as a result of the contradictions and knotworking elements balancing each other out. The contradictions, relating to the contractor for the NHC having to employ residents with limited skills and construction experience as builders, are predominantly located in the residents' activity system. The knotworking elements (the mentoring process initiated by the contractor) are located in the local government activity system.

- Knot SHF3e: One secondary contradiction – relating to the local government rule that an engineer must approve the structural design of the process house – is resolved by knotworking spread equally across both activity systems. WA (an engineer at the COCT UISD) assisted with the structural design, while UBU obtained a sponsorship for the construction of the concrete raft foundation.

- Knot SHF4e: In this knot the contradictions and knotworking elements are spread equally across the two activity systems, with two quaternary contradictions relating to the subdivision plan for the UISP project being resolved by the PRT (local government activity system subject) and PSC (residents' activity system subject) engaging in lengthy negotiations to resolve the contradictions.

As indicated in Table 6.2, there are only two knots where the local government activity system is dominant. The first is knot LTP2e, where MM (the local government district manager) resolved three contradictions in the local government activity system so as to expedite the approval process for the NHC. The second is knot SHF1d, which entailed the resolution of a secondary contradiction regarding land ownership by the mayor in her use of the COCT budget (local government artefact) to purchase the portion of the settlement located on privately owned land so as to enable the commencement of the UISP project.

Table 6.2 Activity system and knotworking elements that pertain to GAP
Table by author

Case	Knot Dominant activity system (lg / r / b) Number of elements that pertain to GAP knotworking					
LWP 10	LWP1c	LWP2c	LWP3c	LWP4b		
	b 3	**r 2**	**r 3**	**r 2**		
LTP 12	LTP1c	LTP1e	LTP2e	LTP3d	LTP3f	LTP4d
	r 2	**r 3**	**lg 1**	**b 1**	**r 2**	**r 3**
SHF 11	SHF1d	SHF2c	SHF3b	SHF3e	SHF4e	
	lg 1	**r 3**	lg 1 | **r 1**	**b 1**	**b 4**	
Dominant activity system is indicated in **bold** type.						

With the exception of knot SHF3b (where an artefact outside of the dominant residents' activity system pertains to GAP knotworking), all of the knotworking elements are located within the dominant or balanced activity system(s). This correlation between dominant activity system and GAP knotworking elements – bearing in mind the distribution of dominant activity systems discussed above – indicates that the artefacts, community, and division of labour that pertain to GAP knotworking are predominantly located in the residents' activity system. As such, GAP derives from and engages with residents' informal spatial practice, and relates to conventional architectural practice through the notion of 'in[formal]ity'. In the majority of knots (11 out of 14), there are two or three GAP knotworking elements. This indicates that GAP is deeply embedded in the activity, and draws on multiple aspects of the dominant activity system in order to resolve contradictions (this will be discussed in more detail in subsection 6.1.1.3).

6.1.1.2 Contradictions

In the LWP case study, 10 of the contradiction elements are located in the local government activity system (Table 6.3). This is mostly the result of the insufficient liaison between BC and the resident leadership while the conventional settlement layout was being prepared, and his continued unwillingness to engage with the resident leadership during the implementation of the co-designed alternative settlement layout that they had prepared together with CORC. Local government rules regarding the required documentation for the UISP project application also contributed to contradictions later on in the case study. Notwithstanding these contradictions, the involvement of CORC as intermediary between the COCT and the resident leadership resulted in the residents' activity system becoming dominant as the case study progressed. However – as is evident in the different outcomes desired by the local government and residents in knot LWP3c (canal widening vs. settlement upgrading) – the imbalance of contradiction elements

between the two activity systems (10 vs. five) has a detrimental effect on the degree to which the object is shared by the two activity systems. The inverse is true for LTP: 14 contradiction elements are located in the residents' activity system, compared to nine in the local government activity system. This is the result of the participatory approach employed by VPUU, with the SNAC constituting a resident-driven project management team that works in collaboration with the various VPUU workstreams. Residents' involvement in the construction and operation of the NHC resulted in further contradictions; and as such, the majority of contradictions relate to the residents' activity system. Conversely, the local government contradictions in knot LTP2e are evidence of the challenging nature of operationalising the notion of 'in[formal]ity' – in this case, attempting to obtain formal approval for the construction of the NHC on land that is not appropriately zoned due to it being located in an informal settlement. In the SHF case study, the contradiction elements have a more equal distribution across the two activity systems. This is the result of two complementary processes: UBU and the residents' collaborative development of a dwelling typology, and the COCT's preparation for an UISP project. These two processes and the contradictions that emerge from them are indicative of the challenge of initiating formal interventions that support informal initiatives developed by residents and their supporting NGOs. In the last knot that was mapped (SHF4e), the challenging role of the architectural professional as intermediary between the two activity systems is made evident, BL of UBU being a member of the PRT appointed by the COCT, and UBU being represented on the PSC, which comprises the resident leadership and local stakeholders.

Table 6.3 Location of contradictions within and / or between activity systems
Table by author

Case	**Knot** Contradictions [element vs. element]					
LWP lg 10 | r 5	LWP1c	LWP2c	LWP3c	LWP4b		
	lgr vs. lga **lga vs. rr**	lga vs. PSO	lgd vs. PSO lgd vs. rr	lgr vs. PSO		
LTP lg 9 | r 14	LTP1c	LTP1e	LTP2e	LTP3d	LTP3f	LTP4d
	ra vs. rr	**ra vs. rr**	**lgr vs. lgr** **lgr vs. PSO** **lga vs. PSO**	**lgr vs. rr** **ra vs. rr** **rr vs. PSO**	lgr vs. rd	**rd vs. rr**
SHF lg 8 | r 11	SHF1d	SHF2c	SHF3b	SHF3e	SHF4e	
	lgr vs. lgd	**rr vs. rr** **rr vs. rr**	**ra vs. PSO**	**lgr vs. PSO** **rr vs. PSO**	**lgr vs. rr** **lga vs. ra**	

Abbreviations for elements indicate both activity system (lg / r) and element (s / a / c / d / r).
Highest values in each case are underlined. PSO counts toward both activity systems.
Contradictions within dominant and balanced activity systems are indicated in **bold** type.

In the LWP case study, three of the six contradictions were between elements of the local government activity system and the PSO (as indicated in Table 6.4). These contradictions emanate from the conventional settlement layout (artefact), BC's unwillingness to engage with CORC and the resident leadership in a constructive manner (division of labour), and the requirements regarding documentation to support an UISP project application (rule). This is indicative of the importance of architectural professionals (those employed by CORC, in this case) developing a comprehensive understanding of the PSO, in order to address contradictions that arise in the local government activity system in a manner that does not disregard residents' understanding of the PSO. As the PSO is in essence a manifestation of the notion of 'in[formal]ity', architectural professionals need to understand the nature of informal spatial practice in the particular settlement they are involved with.

At LTP, there were two contradictions between the local government activity system and the PSO, both relating to VPUU having to obtain formal approval for the construction of the NHC on land that is not appropriately zoned due to its location in an informal settlement. The largest number of contradictions relating to one particular activity system also occurs in this case: five contradictions relating to the residents' activity system, four of these relating to the rules. This is explained in part by the residents' activity system being the dominant activity system in this

Table 6.4 Location and type of contradictions per knot
Table by author

Case	**Knot** Type of contradiction and its location [Primary (1e) / secondary (2e) / quaternary (4e), activity system]					
LWP 1e and 2e: lg 1 | r 0 2e (vs. PSO): lg 3 | r 0 4e: 2	LWP1c	LWP2c	LWP3c	LWP4b		
	2e, lg **4e**	2e, lg (vs. PSO)	2e, lg (vs. PSO) 4e	2e, lg (vs. PSO)		
LTP 1e and 2e: lg 1 | r 4 2e (vs. PSO): lg 2 | r 1 4e: 2	LTP1c	LTP1e	LTP2e	LTP3d	LTP3f	LTP4d
	2e, r	**2e, r**	**1e, lg** **2 x 2e,** **lg (vs. PSO)**	**2e, r** **2e,** **r (vs. PSO)** **4e**	4e	**2e, r**
SHF 1e and 2e: lg 1 | r 2 2e (vs. PSO): lg 1 | r 2 4e: 2	SHF1d	SHF2c	SHF3b	SHF3e	SHF4e	
	2e, lg	**2 x 1e, r**	**2e,** **r (vs. PSO)**	**2 x 2e,** **lg (vs. PSO)** **r (vs. PSO)**	**2 x 4e**	
Highest values in each case are underlined. Contradictions within dominant and balanced systems are indicated in **bold** type.						

case, with VPUU working collaboratively with the SNAC to realise the construction of the NHC. It is furthermore also a result of VPUU being subject to the implicit rules embedded in residents' informal spatial practice, which are often at odds with the artefacts employed by VPUU as well as with the rules of the local government activity system.

SHF sees a more equal distribution of contradiction types, including three contradictions involving the PSO. These relate to the construction of the process house: one to a lack of funding to develop the dwelling prototype (knot SHF3b, residents' artefact), and the other to the residents' rule that permission be obtained prior to construction of the process house and the local government rule that an engineer must approve the structural design of the process house (both knot SHF3e). These contradictions indicate that in the case of SHF, both the COCT and the residents (with assistance from UBU) worked towards achieving a common understanding of the PSO. In all three case studies, quaternary contradictions account for a low portion of the total number of contradictions, pointing towards the fact that activity systems networked around a PSO are to a large extent able to avoid contradictions between themselves. It is in this space – between the two activity systems – where GAP is situated, and from which it operates in relation to both local government and residents.

6.1.1.3 Knotworking

The knotworking elements that pertain to GAP – i.e. both conventional architectural practice and the expanded role of practice in the context of 'in[formal]ity' – have been indicated separately on the mapping so as to isolate GAP from other knotworking that falls outside of the ambit of architectural practice. As such, the focus of this particular analysis is on the elements of the two networked activity systems that contribute to GAP by forming the knots that resolve contradictions as the activity unfolds. In the LWP and LTP case studies, knotworking elements are predominantly located in the residents' activity system (see Table 6.5). At LWP, this is the result of CORC being appointed by the COCT to facilitate the relocation and upgrading process which had stalled due to BC's unwillingness to involve the resident leadership in his planning. The COCT also appointed VPUU to implement the ISTP at LTP, and as such – in both these case studies – the GAP knotworking operated predominantly within the residents' activity system as a result of both CORC (AK) and VPUU (SP) employing collaborative strategies that involved residents at each stage of the process. Two knots (LTP2e and LTP3d) are exceptions to this pattern, with MM and the contractor (both subjects in the local government activity system) expanding their conventional role (division of labour) so as to support the upgrading process. The SHF case study sees knotworking elements balanced between the two activity systems – this is due in part to the local government officials involved in the planning for the UISP project (WA and GM) supporting UBU and the resident leadership in their attempt to construct the process house as a dwelling prototype for settlement upgrading.

Table 6.5 Total knotworking elements in relation to those that pertain to GAP
Table by author

Case	**Knot** Knotworking elements and their location [Activity system, knotworking elements (GAP knotworking elements)]					
LWP lg 1 (0) r 13 (10)	LWP1c	LWP2c	LWP3c	LWP4b		
	lg 1 (0) **r 4 (3)**	**r 3 (2)**	**r 3 (3)**	**r 3 (2)**		
LTP lg 5 (2) r 10 (9)	LTP1c	LTP1e	LTP2e	LTP3d	LTP3f	LTP4d
	r 2 (2)	**r 3 (2)**	**lg 2 (1)**	**lg 3 (1)**	**r 2 (2)**	**r 3 (3)**
SHF lg 8 (5) r 7 (6)	SHF1d	SHF2c	SHF3b	SHF3e	SHF4e	
	lg 3 (1)	**r 3 (3)**	lg 1 (1) **r 2 (1)**	**lg 2 (1)**	**lg 2 (2)** **r 2 (2)**	
Highest values in each case are underlined. Knotworking elements in dominant and balanced systems are indicated in **bold** type. GAP knotworking elements are indicated in brackets.						

Across the three case studies, the most prominent knotworking elements that pertain to GAP are as follows (as indicated in Table 6.6): residents' subject (10 occurrences), residents' division of labour (eight occurrences), and residents' artefacts (six occurrences). In all 10 occurrences of the residents' subject, architectural professionals (AK, SP, and BL) provided assistance or facilitation, developed typologies, or entered into negotiations so as to resolve contradictions (thereby impacting on their division of labour). The residents' artefacts employed as GAP knotworking elements are also mostly architectural in nature: settlement layouts, cardboard models, user scenarios, and dwelling typologies. These artefacts are made accessible and useful to residents through the facilitation provided by the architectural professionals involved in each case study.

In the local government activity system, both artefacts and division of labour are employed as GAP knotworking elements three times. The artefacts are (i) the mentoring process initiated by the NHC contractor, (ii) the SHF UISP project, and (iii) the BLC competition. The division of labour includes (i) the assistance MM provided to VPUU, (ii) the assistance WA provided to UBU, and (iii) the lengthy negotiations entered into by two COCT departments, the SHF PRT, and PSC to resolve contradictions relating to the subdivision plan for the upgrading of the settlement.

Table 6.6 Location of knotworking elements that pertain to GAP
Table by author

Case	**Knot** GAP knotworking elements [Activity system and total number of elements, type of elements]					
LWP lg 0 | r 10 4 x **rs**, 2 x **ra**, 1 x **rc**, 3 x **rd**	LWP1c	LWP2c	LWP3c	LWP4b		
	r 3 **rs, ra, rd**	r 2 **rs, rd**	r 3 **rs, rc, rd**	r 2 **rs, ra**		
LTP lg 2 | r 10 1 x **lga**, 1 x **lgd** 4 x **rs**, 3 x **ra**, 3 x **rd**	LTP1d	LTP1e	LTP2e	LTP3e	LTP3f	LTP4d
	r 2 **rs, ra**	r 3 **rs, ra, rd**	lg 1 **lgd**	lg 1 **lga**	r 2 **rs, rd**	r 3 **rs, ra, rd**
SHF lg 5 | r 7 1 x **lgs**, 2 x **lga**, 2 x **lgd** 2 x **rs**, 1 x **ra**, 1 x **rc**, 2 x **rd**	SHF1d	SHF2c	SHF3b	SHF3e	SHF4e	
	lg 1 **lga**	r 3 **ra, rc, rd**	lg 1 | r 1 lga, **rs**	lg 1 **lgd**	lg 2 | r 2 **lgs, lgd,** **rs, rd**	
Abbreviations for elements indicate both activity system (lg / r) and element (s / a / c / d / r). Highest values in each case are underlined. Knotworking elements in dominant and balanced systems are indicated in **bold** type.						

6.1.1.4 Relationship between contradictions and knotworking

The ratio of contradictions to GAP knots provides an indication of how effectively contradictions were resolved in each knotworking instance: the higher the ratio, the more contradictions were resolved with the same knot. In the LWP case study (see Table 6.7), four GAP knots contributed to the resolution of 10 contradictions (≈ 1 : 2). For LTP, the ratio was six GAP knots to 13 contradictions, and for SHF it was 5 GAP knots to 11 contradictions (both also ≈ 1 : 2). However, when looking at individual knotworking instances (e.g. LWP3, LWP2, and SHF4), ratios as high as one GAP knot to four contradictions are achieved. With the exception of LTP1 and SHF3 (which pertain to architectural communication and a lack of funding to construct the process house, respectively), the remaining knotworking instances achieve a ratio of one GAP knot to two contradictions, indicating that the right combination of knotworking elements has the potential to simultaneously resolve multiple contradictions.

In the LWP case study, the local government activity system yielded the largest number of contradictions (seven, compared to two in the residents' activity system) (Table 6.8). All of the GAP knotworking elements were in the residents' activity system, however, which points to the inability of the COCT to address the contradictions that arose within their own activity system.

Table 6.7 Ratio of contradictions to knots per knotworking instance
Table by author

Case	**Knotworking instance** Ratio of contradictions to knots [Contradictions : knots (GAP knots)]			
LWP 10 : 6 (4)	LWP1	LWP2	LWP3	LWP4
	2 : 1 (1)	2 : 2 (1)	4 : 2 (1)	2 : 2 (1)
LTP 13 : 7 (6)	LTP1	LTP2	LTP3	LTP4
	3 : 2 (2)	4 : 1 (1)*	4 : 2 (2)	2 : 2 (1)
SHF 11 : 5 (5)	SHF1	SHF2	SHF3	SHF4
	2 : 1 (1)	2 : 1 (1)	3 : 2 (2)	4 : 1 (1)*

Highest ratio of contradictions to GAP knots in each case study is underlined.
GAP knotworking elements are indicated in brackets. In the two knotworking instances marked with an asterisk (*), not all contradictions had to be resolved in order for the activity to proceed.

Table 6.8 Location of contradictions and knotworking elements per activity system
Table by author

Case [Most contradictions, most GAP knotworking elements]	**Knotworking instance** Location of contradictions and knotworking elements [Total 1e and 2e contradictions, total knotworking elements (total GAP knotworking elements)]			
LWP lg, r	LWP1	LWP2	LWP3	LWP4
	lg 1, 1 (0) r 0, 4 (3)	lg 2, 2 (0) r 0, 3 (2)	lg 3, 2 (0) r 1, 3 (3)	lg 1, 0 (0) r 1, 6 (2)
LTP r, r	LTP1	LTP2	LTP3	LTP4
	r 3, 6 (5)	lg 3, 2 (1)	lg 0, 3 (1) r 2, 2 (2)	r 2, 4 (3)
SHF b, b	SHF1	SHF2	SHF3	SHF4
	lg 2, 3 (1) r 0, 4 (0)	r 2, 3 (3)	lg 1, 3 (2) r 2, 2 (1)	lg 2, 2 (2) r 0, 2 (2)

Local government (lg) / residents (r) / in balance (b). A contradiction within PSO counts toward both activity systems. Highest values in each case are underlined. GAP knotworking elements are indicated in brackets.

By partnering with CORC to facilitate the reblocking and upgrading of the settlement, the COCT facilitated the incorporation of informal spatial practice into the upgrading intervention at LWP. This enabled the resolution of the contradictions through knotworking emanating from the residents' activity system. At LTP, the residents' activity yielded the most contradictions (seven, compared to three) as well as the most GAP knotworking elements (ten, compared to two). To a large extent, this is by virtue of VPUU being appointed as implementing agent in the COCT's ISTP programme, effectively situating the locus of the upgrading intervention within the residents' activity system. As such, the architectural professionals employed by VPUU performed a number of actions that fall outside of the ambit of conventional architectural practice. Finally, in the SHF case study, the contradictions and GAP knots were equally distributed across the two activity systems. As discussed in the preceding subsection, this can be ascribed to the local government officials that were involved in the planning for the UISP project (WA and GM) supporting UBU and the resident leadership in their attempt to construct the process house as a dwelling prototype for settlement upgrading, thereby bringing the two activity systems into balance as the case study developed.

6.1.2 Competencies and capacities

In this subsection, the comparative analysis of the empirical findings continues with a discussion of the SACAP competencies and 'subversive praxis' capacities in relation to the 15 GAP knots that were identified in the three case studies. This discussion draws on the SACAP competencies – introduced in section 3.1 during the critical appraisal of local architectural practice – and the capacities for 'subversive praxis' proposed as a heuristic to assist architectural (and other built environment) professionals in developing an appropriate way of "being and moving in complexity" (Pieterse, 2004: 350, discussed in section 3.2). The mapping of the relevant SACAP competencies and 'subversive praxis' capacities onto the individual GAP knots is included in Appendix D.

6.1.2.1 SACAP competencies

The SACAP competencies are indicated in Table 6.9, with the number of GAP knots that each competency relates to indicated in brackets after the competency description. Only 30 of the 44 competencies (≈ two thirds) contribute to the knotworking encountered in the case studies. The competencies are organised into 10 categories, of which seven feature prominently in the knotworking explored. The total number of occurrences of each category's competencies in the 15 GAP knots is indicated in brackets below the category description in Table 6.9. The most prominent categories that contribute to knotworking are:

- **Architectural design**: The five competencies in this category occur 19 times throughout the knotworking observed in the case studies, particularly in the knots that pertain to

the collaborative development of dwelling typologies (LWP4b, SHF1d) and the design of the NHC (LTP1c and LTP1e).

- **Environmental relationships**: These competencies relate to the relationship between the natural and the built environment, and are employed eight times in the knotworking relating to the conventional and alternative settlement layout in the LWP case study (knots LWP1c, LWP2c, and LWP4c).

- **Construction technology**; and **Building structures**: Seven competencies are included in these two categories, and have a similar distribution as the five architectural design competencies. Beyond this correlation, they also appear in knot SHF3b in that they are drawn on in the development of the dwelling prototype for the BLC. MM also employed some of these capacities in expediting the approval process for the NHC (knot LTP2e).

- **Contextual and urban relationships**; and **Architectural history, theory, and precedent**: These two categories encompass eight competencies relating to the understanding of the urban environment and architectural precedent. As such, they relate to the competency category of Environmental relationships, with which they share three knots in the LWP case study. Furthermore, they share three knots with the category of Architectural design competencies (LWP2c, LWP4b, and LTP1e). Competencies relating to the use of architectural precedent also inform knots SHF2c and SHF3b, which pertain to the dwelling typology proposed by NP and the further development thereof into a dwelling prototype for the BLC.

- **Contract documentation and administration**: These competencies – particularly those relating to local authority approval requirements – are present in nine GAP knots. This is understandable, given that the notion of 'in[formal]ity' which informs GAP describes a dialectic relationship between formal and informal spatial practice, and the process of obtaining local authority approval – either for settlement layouts or for individual buildings, such as the NHC or process house – is a prime arena for this dialectic relationship to play out in. The formal nature of this process has contributed to a number of contradictions across the three case studies, and it is often local government officials (e.g. MM, WA, and GM) that cooperate with architectural professionals to resolve such contradictions. As such, the ability to liaise and collaborate with local government officials ought to be a key competency.

The last of the ten categories, which doesn't feature as prominently as those listed above, pertains to office practice, legal aspects, and ethics. It nonetheless warrants discussion, as it includes the "ability to participate meaningfully in the management and administration of a building project" and the "ability to set up and run a building project successfully" (SACAP, 2010). As discussed in section 3.2, socio-technical facilitation is an important component of GAP as an emerging mode of

Table 6.9 SACAP competencies with number of GAP knots that each competency category and individual competency relates to indicated in brackets
Adapted from SACAP (2010)

Category	Competencies
1. **Architectural design** (19)	a. Ability to create a competent building design of a complex nature, based on parameters and constraints developed through independent scientific research, and sensitive to issues of culture, environment and sustainability. Such a design is to be created in a responsible, appropriate, and economical manner in an urban, suburban, or rural context. (3) b. Ability to appraise and define a complex architectural problem. (4) c. Ability to prepare an appropriate concept. (3) d. Ability to develop the design to an ultimate and rational conclusion. (4) e. Ability to present the design synthesis in a logical manner. (5)
2. **Environmental relationships** (8)	a. Understanding the relationship between the natural and built environment. (2) b. Ability to evaluate landscapes and environmental structures in basic terms in an analytical, constructive, and critical manner. (3) c. Understanding of the basic spatial, functional, and aesthetic aspects of landscape architecture. (3)
3. **Construction technology** (21)	a. Ability to implement innovative applications of construction methods and uses for materials related to multi-storey, multi-functional, complex building types. (5) b. Ability to recognise the demands of context, as well as local resources and appropriate technologies that harmonise with the environment, to the extent that which these influence the construction of a building. (6) c. Ability to develop durable, cost-effective, and responsive construction details. (5) d. Ability to conduct advanced research into construction methods and materials, and their appropriate applications. (5)
4. **Building structures** (11)	a. Understanding of structural concepts pertaining to buildings. (5) b. Ability to integrate structure and building design. (5) c. Understanding of calculations regarding the structural aspects of buildings. (1)
5. **Contextual and urban relationships** (9)	a. Understanding of the basic spatial, functional, and aesthetic aspects relating to urban design. (3) b. Ability to evaluate urban environments in very basic terms in an analytical, constructive, and critical manner. (5) c. Understanding of and sensitivity to urban aspects when designing individual buildings. (1)
6. **Architectural history, theory, and precedent** (13)	a. Understanding of architectural history and theory as part of a wider natural, social, technological, and cultural system. b. Ability to evaluate and analyse the built form critically in complex terms. (4) c. Understanding of the principles of learning from historical precedent. (2) d. Understanding of the social, ethical, spatial, and aesthetic aspects of the environment. (7) e. Ability to conduct relevant research into architectural theories.

Category	Competencies
7. **Building services and related technologies** (3)	a. Ability to integrate the various technological aspects relating to services in one cohesive design and find technological solutions. (2) b. Understanding of the building regulations pertaining to all building services. c. Understanding of the following technological aspects and building services: drainage and water reticulation, electrical and electronic services and lighting, communications, air and gas supply, heating and cooling, elevators and escalators, fire protection and control, and acoustics and sound systems. (1)
8. **Contract documentation and administration** (18)	a. Ability to produce a comprehensive set of contract documents for a complex building to acceptable practice standards. b. Ability to develop durable, cost-effective, climate-responsive construction systems and details. (1) c. Ability to recognise the demands of context and local resources, and appropriate technologies that harmonise with the environment. (5) d. Understanding of issues of sustainability of the built environment and ability to evaluate materials in an ethical and socially responsible manner. (3) e. Ability to do component and material specification. f. Ability to implement the National Building Regulations (NBR) as well as the requirements of the National Home Builders Registration Council (NHBRC). (1) g. Ability to respond to local authority approval requirements and procedures. (8)
9. **Computer applications** (1)	a. Understanding of the range of computer technology presently in use in architectural practice. b. Ability to apply a range of computer technology presently in use in architectural practice in the execution of work, with computer software including web browsers and communication programs, word processing, spreadsheets, databases, architectural drawing and three dimensional modelling programs, and graphic and image editing programs. (1)
10. **Office practice, legal aspects, and ethics** (7)	a. Ability to comply with all the regulatory and legal aspects of the profession. b. Ability to implement the contents of the various building contracts and the SAIA practice manual. c. Ability to apply the basic concepts of business structures and principles pertaining to the architectural profession. d. Ability to design a feasible information access and retrieval system. e. Ability to design a functional and integrated management system. f. Ability to implement administrative and logistical support systems in a practice. g. Ability to design a marketing strategy. h. Ability to participate meaningfully in the management and administration of a building project. (4) i. Ability to set up and run a building project successfully. (3)

architectural practice, and these two competencies – if understood to encompass the architectural project from its inception until after its completion, rather than just managing the building project – have the potential to provide an entry point to start the broadening of the scope of architectural practice. Socio-technical facilitation could become a new category of competencies that deals with participatory co-design processes, project planning and negotiation, architectural literacy and skills development, as well as building operation and monitoring.

6.1.2.2 Capacities for 'subversive praxis'

Broadening the scope of architectural practice presents architectural professionals with an opportunity to invent new roles for themselves. To this end, four capacities with the potential to assist in broadening the scope of architectural practice were introduced in section 3.2. These capacities for 'subversive praxis' are (i) code-switching between multiple registers of knowledge; (ii) adopting a multi-focal perspective; (iii) self-reflexivity; and (iv) being empirically informed and symbolically attuned (Pieterse, 2004: 350-352). Together, these capacities represent an open-ended extension of the prescribed SACAP competencies that delineate conventional architectural practice. The mapping of the relevant 'subversive praxis' capacities onto each individual GAP knot is included in Appendix D. Code-switching (CS) appears in eight of the 15 knots, the adopting of a multi-focal perspective (MFP) in 12, and self-reflexivity (SR) in 11. Being empirically informed and symbolically attuned was mapped separately, with being empirically informed (EI) occurring in eight, and being symbolically attuned (SA) in seven of the 15 knots. As such, the ability to adopt a multi-focal perspective and to be self-reflexive is relevant to more than three quarters of the GAP knots, with the other 'subversive praxis' capacities contributing to roughly half of the knots. The distribution of these capacities is discussed in more detail below:

- Knot LWP1c: In the planning and negotiation process they facilitated, CORC responded to the concerns of the two COCT departments as well as those of residents (CS). In doing so, they managed to integrate the residents' concerns regarding BC's settlement layout into the formal processes relating to the canal widening project (MFP). Furthermore, AK employed his knowledge of the residents' concerns regarding BC's settlement layout and the requirements of the canal widening project (EI) in a manner that expanded the PSO to include the residents' aspirations for the upgrading of their settlement (SA).

- Knot LWP2c: After presenting the co-designed layout to DF and BC, AK reviewed its design so as to reduce the substantial deviations from the services infrastructure layout. In doing so, he managed to strike a balance between the requirements embedded in the services infrastructure layout (EI) and the residents' settlement upgrading aspirations (SA). WA's warning regarding the likelihood of protest action if the co-designed layout were not implemented was also a response to the pressure that BC exerted on AK to expedite the process by adhering to the services infrastructure layout's requirements (SA).

- Knot LWP3c: During the move to the relocation site, CORC was facilitating the ongoing negotiation between BC and the resident leadership regarding the requirements of the services infrastructure layout (CS). AK had to compensate for BC's lack of concern with the residents' aspirations as embedded in the co-designed layout, and requested two CORC employees to mark out the co-designed layout that BC had refused to mark out. CORC also had to maintain a balance between collaboration (taking over aspects of BC's work) and opposition (holding BC accountable to the residents' aspirations) (MFP, SR).

- Knot LWP4b: DBRS approached CORC with a proposal to undertake a live project to explore options for the further upgrading of LWP, and to support the resident leadership in preparing the required documentation for an UISP application (SR). The live project was informed by feasibility studies prepared by AK, as well as information provided by CORC and the COCT; and the resident leadership also engaged in peer exchanges (EI). The DBRS students interviewed resident volunteers about their needs and desires, and incorporated these divergent opinions into the co-design process by drawing on their own procedural knowledge and experience (CS, EI, SA). In undertaking the live project in support of an UISP application, DBRS and CORC also challenged the assumption that development occurs incrementally through government-driven interventions, as was the case with the initial upgrading of the settlement (MFP).

- Knot LTP1c: SP introduced cardboard models as an artefact to facilitate the architectural communication between herself and the SNAC members who took part in the co-design process of the NHC. This process allowed the integration of residents' situated knowledge into the design, legitimising their informal spatial practice and engaging with them as equals (CS, MFP).

- Knot LTP1e: The SNAC had to consult with a broader group of stakeholders (the ward committee, members of local groups, and future users) and report back before the next iteration of the co-design process could proceed (MFP, EI). In order to support the SNAC in their consultation, SP and the VPUU workstream representatives facilitated the collaborative development of user scenarios to envisage the activation of the NHC (CS, SR, SA).

- Knot LTP2e: MM stood central in the knotworking that resolved the contradictions relating to the approval process for the NHC. Together with her providing of information regarding the use of shipping containers for a public building and her assistance in obtaining approval from the COCT Fire Safety Department, MM's expediting of the approval process within her district LUM & BDD can be understood as a political act that challenged the power relations between residents and local government (MFP, SR, EI).

- Knot LTP3d: When confronted with the rules to employ residents with limited skills and construction experience as builders and to use alternative construction techniques in erecting a temporary structure, the contractor initiated a mentoring process to address the resident builders' skills shortage (MFP, SR).

- Knot LTP3f: The SNAC and the local groups responsible for the day-to-day operation of the NHC were unable to maintain the solar water heater and greywater recycling system installed in the place of municipal services connections. SP had to extend her involvement well beyond the completion of the NHC so as to address these and other problems that arose, and embedded herself into the day-to-day operation of the NHC so as to transfer skills to the SNAC and local groups that used the building (CS, SR).

- Knot LTP4d: MP's absence resulted in insufficient community participation during the design process for the spatial intervention, which left the SNAC feeling that they had not been sufficiently consulted. Their concerns regarding the form and function of the proposed structure were based on a misinterpretation of computer renderings, and DBRS had to prepare revised computer renderings and a cardboard model to clarify the design (CS, SR). An isiXhosa-speaking student accompanied me to the SNAC meeting to present these new artefacts, and he was sensitive to the concerns expressed by some members of the SNAC regarding the proposed structure (SA). As such, we proposed the addition of grab bars and a tyre wall to ensure that the structure would be appealing to both young children and teenagers (MFP).

- Knot SHF1d: During his meeting with the mayor, SJ was informed that the COCT had purchased the remaining portion of land that SHF is located on and that the UISP project could proceed. The mayor was aware that the land purchase was a prerequisite of the UISP project (EI), and the actions that led up to this point (including the violent protest that led to SJ being invited to meet with the mayor) are a good example of dialectical urbanism, where the urban is seen as a complex set of social relations that are often subject to conflict. This situation also illustrates the challenge of sustaining collaboration between local government and residents over prolonged periods of time (MFP).

- Knot SHF2c: During the presentation of the dwelling typology developed by UBU – which the residents immediately rejected – NP took ownership of the co-design process. She used her knowledge regarding cultural practices as well as the relevant representation technique (using wooden blocks to represent the format and size of dwelling units) to propose an alternative typology that incorporated the technology proposed by UBU in a manner that addressed the residents' concerns (CS, MFP, EI, SA). In recognising that a transition to sustainable urbanism should concern itself with social justice, UBU acknowledged and developed the social capital displayed during this meeting and agreed to refine and further develop the typology proposed by NP (SR).

- Knot SHF3b: GM's insistence that UBU enter the dwelling typology into the BLC led to a donation that enabled UBU to finance a full-scale prototype thereof. GM was aware that the exposure and public awareness generated by entering the dwelling prototype into the BLC would garner support for the efforts of UBU and the SHF residents to upgrade their settlement (MFP, SR).

- Knot SHF3e: UBU sought to obtain permission from the UISD to construct the process house on a site adjacent to the existing NHC, as this would assist in "holding the space" for the public precinct envisioned in the UISP project. It would furthermore also provide an opportunity to engage with residents by using the process house as a tool to stimulate discussion about self-build typologies (MFP). WA's action of providing informal permission for the construction of the process house (the email stating that the UISD would not pursue the demolition of the process house) points to a relational innovation – recognising that incremental upgrading entails a combination of formal and informal processes – between the UISD and the resident leadership (SR).

- Knot SHF4e: The SPUDD's application of their own guidelines in the development of a subdivision plan, the latter disregarding the needs and requirements articulated by the PSC in their own subdivision plan, shows a lack of a MFP and the ability to be EI and SA. However, lengthy negotiations by all role players enabled the UISP project to commence in accordance with the superblock plan which had already been approved. As such, operationalising the notion of 'in[formal]ity' requires that formal processes (such as the approval of the subdivision plan) yield to more flexible and facilitated co-design processes that empower residents to take ownership of both the planning and implementation of upgrading interventions (CS, MFP, SR, EI, SA).

6.1.2.3 Conclusion

The comparative analysis of empirical findings has drawn attention to the patterns that emerge from the activity system mapping as well as those that relate to the SACAP competencies and 'subversive praxis' capacities employed when engaging in GAP. Contradictions emerge when new elements (such as informal spatial practice) are introduced into the respective networked activity systems, and are understood as a dynamic site of change that drives the transformation of activity. In the research reported on in this dissertation, this transformation of activity entails the broadening of architectural practice that occurs when engaging in GAP in transitions to sustainable urbanism (premised on the *in situ* upgrading of informal settlements in collaboration with residents and local organisations). The analysis of the activity system mapping has indicated that the majority of contradictions (i.e. where transformation is most likely to occur) relate to the PSO: in the LWP and LTP case studies, the majority of contradictions are secondary ones between elements of the local government activity system and the PSO, and in the SHF case study the same applies to the residents' activity system and the PSO. This is not surprising given the fact that the PSO in transitions to sustainable urbanism is a benign runaway object that is not under the control of any particular individual or group[1]. As such, architectural professionals require relational agency in order to collaborate with residents in constructing PSOs that encompass multiple perspectives, interpretations, engagements, and practices.

[1] Refer back to subsection 4.2.1 for further detail on PSOs and runaway objects.

The new elements introduced into both activity systems in the research reported on in this dissertation include the 'subversive praxis' capacities that are employed by subjects in both activity systems. Of these capacities, adopting a MFP (sensitive to the impact of power relations) and employing SR in one's own practice (in relation to others) occur in more than three quarters of the knots explored, providing evidence of the fundamentally relational nature of GAP. The SACAP competencies are also drawn on in the knotworking that drove the development of GAP in the three case studies. As such, it indicates that the core competencies of architectural practice do not become less relevant in the context of 'in[formal]ity'. Instead, competencies relating to architectural design, construction technology, and contract documentation and administration feature prominently in the 15 GAP knots that were mapped. Seen together, the SACAP competencies and 'subversive praxis' capacities point to the central role that socio-technical facilitation plays in GAP, and the potential of participatory co-design, project planning and negotiation, architectural literacy and skills development, and building operation and maintenance to form part of a new category of architectural competencies that pertains to socio-technical facilitation. The incorporation of such new competencies into conventional architectural practice will enable architectural professionals to invent new roles for themselves, and to broaden their practice by developing contextual solutions that work in the present and add up to structural change within the profession in the future.

6.2 Theoretical recapitulation: Informal capacities

Such a broadening of architectural practice requires capacity building that contributes to the transformation of both the tangible and intangible aspects of conventional architectural practice. The latter includes the altering of mindsets, behavioural patterns, degrees of legitimacy, and the profession's relationship with informal spatial practice. Capacity building that fosters GAP as an emergent mode of practice will require a sustained engagement with the less familiar terrain of the informal so as to enable the incorporation of expansive learning as an integral part of architectural practice. Accordingly, the exploration of GAP in the research reported on in this dissertation contributes to the modelling of a vision of the ZPD as a learning space that creates a bridge between conventional architectural practice and the informal capacities required to engage with residents in supporting informal settlement upgrading as a transition to sustainable urbanism. As such, expansive learning entails the expansion of architectural professionals' social and intellectual involvement with residents and their informal spatial practice.

6.2.1 Implementation of epistemological principles

The exploration of GAP reported on in this dissertation employs empirical AT analysis, and as such is underpinned by two epistemological principles[2]. In this section I will revisit the principles of 'dual stimulation' and 'ascending from the abstract to the concrete' with reference to the empirical findings derived from the case studies.

6.2.1.1 Dual stimulation

Being concerned with the development of human functioning (as opposed to the exploring of functions that have already developed), dual stimulation entails confrontations with problems that lie beyond research participants' present capabilities. It draws attention to the manner in which architectural professionals address problems that emerge during upgrading interventions with artefacts embedded in conventional architectural practice as well as artefacts found in the context of intervention, be they existing or co-constructed with residents and local organisations. In the knotworking observed in the three case studies (Table 6.10), eight of the 15 knots included artefacts (two in the local government activity system (knots LTP3d and SHF1d) and the remainder in that of the residents). While the majority of the artefacts derive from conventional architectural practice, there are ones that are co-constructed in the intervention context: a planning and negotiation process, knowledge of residents' aspirations, and co-designed alternative settlement layout (knot LWP1c); live project (knot LWP4b); and mentoring process (knot LTP3d). Upon reflecting on the observed knotworking as a whole, there are also a number of further artefacts that can be identified, despite not being mapped during the instances of knotworking concerned.

Table 6.10 Artefacts employed in the GAP knots observed in the case studies
Table by author

Artefacts employed in GAP knots			
Knot	**Artefacts**	**Knot**	**Artefacts**
LWP1c	Planning and negotiation process Knowledge of residents' aspirations Co-designed alternative settlement layout	LTP3d	Mentoring process
LWP4b	Live project Revised settlement layout and dwelling typologies	LTP4d	Revised computer rendering and cardboard model Language skills
LTP1c	Cardboard models	SHF1d	UISP project
LTP1e	Cardboard models User scenarios to plan activation	SHF2c	Alternative dwelling typology
		SHF3c	BLC

[2] These principles were discussed in section 4.2.3.

Of the artefacts that appear in the table above, four warrant further discussion. Firstly, the live project (knot LWP4b) provided an opportunity to involve young architectural technologists (the DBRS students) in a participatory co-design process situated in a real-world context, and as such served as a vehicle to experiment with co-production and collaborative design as an emergent form of architectural practice. Secondly, in knots LTP1c and LTP1e, the artefacts included cardboard models. By making only a small adjustment (introducing a new artefact), the cardboard models provided an additional means of communication that expanded the limited reach of conventional architectural practice to include residents with a different level of (visual) literacy than the architectural professionals concerned. Thirdly, despite the contractor initiating the mentoring process (knot LTP3d), the latter does hold lessons for architectural professionals. The mentoring process increased the capacity of the resident builders to contribute to the upgrading of their settlement, in that they were enabled to assist with the construction of the NHC. As such, the mentoring process is illustrative of the fact that empowerment does not require residents to equal the knowledge and skills of architectural professionals, but receive only that which is relevant to the task at hand. Similarly, in taking responsibility for the operation of the NHC (knot LTP3f), the SNAC and local groups only required a limited proportion of the technical and specialist knowledge that SP contributed to the process. Lastly, a co-design process enables architectural practice that is flexible enough to yield to the larger social dynamics within which it is embedded. In knot LTP4d, this was achieved by making small adjustments to the design of the spatial intervention so as to address the concerns raised by the SNAC. In knot SHF2c, NP took ownership of the co-design process by employing her knowledge regarding cultural practices, as well as the wooden blocks used to represent the dwelling typology, to challenge the typology proposed by UBU. In engaging with residents in both these knots, DBRS and UBU embedded their architectural practice in a larger process of enablement.

The further artefacts, which were not mapped during the individual instances of knotworking observed, but which become evident when the knots are viewed collectively, are presented below in the order in which they were employed in the case studies:

- Socio-technical facilitation: As discussed in the conclusion to the previous section, socio-technical facilitation is a prominent aspect of GAP. This type of facilitation is evident in all of the case studies, and particularly in LTP, where CORC incorporated innovative practices such as resident-driven mapping, enumerations, and co-design into the upgrading intervention (knot LWP1c). As such, socio-technical facilitation results in a shift in the power relations between residents, local government, and architectural professionals, in allowing residents to take ownership of the knowledge that informs settlement upgrading.

- Mediation: AK played a mediating role between residents and local government in reviewing the co-designed layout so as to reduce the deviations from the services infrastructure layout (knot LWP2c). In their relationship with the COCT, CORC also attempted to maintain a balance between collaboration (taking over aspects of the

work assigned to BC) and opposition (holding local government accountable to their undertaking to respect residents' upgrading aspirations) (knot LWP3c).

- Peer exchanges: Such exchanges are crucial to building grassroots networks, and the sharing of situated knowledge between the LWP resident volunteers and residents of informal settlements who have employed alternative and affordable construction technologies contributed to the development of alternative dwelling typologies during the live project (knot LWP4d).

- Residents' tacit knowledge and skills: VPUU recognises and draws on these by, from the onset, involving the SNAC, local groups, and future users of NHC in the architectural process. This incorporation of residents into the design process as equal partners legitimises their spatial practice and empowers them, thereby expanding architectural practice and promoting social justice. Evidence of this is the fact that some of the LTP resident volunteers have secured formal employment at VPUU (knot LTP1e).

- Informal spatial practice: Following on from the previous point, informal spatial practice is understood as both a result of and a response to the limitations of local government practice (knot LTP2e). Likewise, it is also a result of and a response to the limitations of conventional architectural practice, as seen in the SNAC's halting of the construction of the spatial intervention by raising concerns about its form and function, due to their perception of not having been sufficiently consulted (knot LTP4d).

- Understanding of sustainability: MM employs an ethical and sociological, rather than technical, understanding of sustainability, which leads her to engage with the complexity at hand in a constructive manner and make informed decisions regarding the priorities of the ISTP project. Her weighing up of local government priorities (compliance with formal procedures) and those of residents (constructing the NHC) results in a contextual solution – the decision to allow the construction of a temporary structure – that disrupts the local government's socio-technical regime by introducing a system innovation that incorporates the priorities of residents into formal planning procedures (knot LTP2e).

- Relational innovation: The COCT's partnerships with CORC and VPUU disrupt the agreed conventions, rules, and norms of the local government socio-technical regime by allowing more time for a participatory, co-design process. This process entails a negotiation of power between local government and residents, with residents being empowered to participate as equal partners in the production of space. WA also effects a relational innovation between the COCT and the SHF resident leadership by providing a (fairly informal) written guarantee that the UISD would respect the construction of the process house as part of the resident leadership's own efforts toward the sustainable upgrading of their settlement (knot SHF3e). This disrupts the local government's socio-technical regime, and in doing so broadens the range of upgrading practices at the COCT's disposal.

While dual stimulation draws attention to the artefacts used to address problems that arise in the course of upgrading interventions, it does not shed much light on the informal capacities that are employed and developed when engaging in GAP.

6.2.1.2 Ascending from the abstract to the concrete

Expansive learning, understood as a stepwise process of ascending from the abstract to the concrete, enables the development of such informal capacities. The research reported on in this dissertation involves all the stages of this process: (i) the use of artefacts in informal settlement upgrading interventions (experimentation within a problematic situation); (ii) proposing the notion of 'in[formal]ity' as an idea to guide the research (identifying a 'germ cell' behind the problematic situation); (iii) exploring GAP in the three case studies (testing the 'germ cell' in its different material manifestations); and (iv) identifying the informal capacities employed and developed when engaging in GAP (developing a theoretically mastered solution to the initial problematic situation). The latter stage of the process is engaged with in detail in the next subsection.

6.2.2 Expansive learning and capacity building

As discussed at the onset of this section, expansive learning entails the increased social and intellectual involvement of architectural professionals with residents and their informal spatial practice. In the research reported on in this dissertation, this involvement was facilitated by an exploration of GAP in the three live project case studies. GAP was positioned as an intermediate 'empty stage' between the theoretically structured activity model and the experiential model of architectural practice in the context of informal settlement upgrading, and used to capture the ideas that emerged. The latter are understood to be the informal capacities that architectural professionals employ when engaging with residents in the co-production and collaborative design of upgrading interventions. Framed in relation to the third and last aim of the research – to explore the impact of GAP as an emergent mode of practice at niche level on the regime of conventional architectural practice – the competencies and capacities that were mapped onto the GAP knots are understood to constitute the impact of GAP on conventional architectural practice. As such, the process of expansive learning is concluded in this section with a recapitulation of the informal capacities that are employed and developed when architectural professionals engage in GAP in transitions to sustainable urbanism.

In the first section of this chapter, I concluded that the competencies for conventional architectural practice (as prescribed by SACAP) are equally relevant in the context of 'in[formal]ity'. However, it is crucial for architectural professionals to inform their deployment of these capacities with a thorough analysis and understanding of the specific intervention context, including the informal spatial practice of the residents concerned. When employed in conjunction with the contextually-informed SACAP competencies, the 'subversive praxis' competencies assist in broadening the

scope of architectural practice by reiterating the importance of a situated analysis of the problem situation informing any action taken. Accordingly, this research understands informal capacities as a combination of the SACAP competencies, the 'subversive praxis' capacities, as well as those pertaining to socio-technical facilitation[3]. With reference to the theoretical perspective[4], informal capacities form a link across the 'technical vacuum' that separates everyday activities from non-everyday activities such as architectural practice. As such, informal capacities enable architectural professionals to border-cross and to consider their own practice from within the intervention context. Therefore, informal capacities offer architectural professionals – who it enables to comprehend the socio-technical regime of local government as well as the informal spatial practice of residents – the opportunity to foster spatial justice by advocating on behalf of the latter in support of the *in situ* upgrading of their settlements as a transition to sustainable urbanism. In doing so, architectural professionals' involvement with residents and their informal spatial practice is extended even further, fostering a continuous process of expansive learning that consolidates existing informal capacities and leads to the development of new ones.

6.3 Towards grounded architectural practice

6.3.1 Conclusion

The relationship between GAP and informal capacities is best understood as iterative: informal capacities are developed when architectural professionals engage in GAP, these capacities broaden the scope of GAP as an emergent mode of architectural practice, which in turn requires the development of more informal capacities. To return to the MLP according to which the aims of the research presented in this dissertation are structured: as the virtuous cycle of GAP and informal capacities driving one another's expansion and development continues, the impact of GAP (niche-level) on conventional architectural practice (regime-level) increases and stimulates systems innovations that foster transitions to sustainable urbanism. As such, the two ideas that have guided and structured this research – the notion of 'in[formal]ity' and the phenomenon of GAP – have enabled an exploration of how architectural professionals can support residents in their transitions to sustainable urbanism. Furthermore, as informal settlement upgrading is but one type of transition to sustainable urbanism, GAP holds the potential to be applied in a number of different contexts.

In chapter 2, a contextual perspective was provided that posited informal settlement upgrading as a transition to sustainable urbanism and confirmed the context in which the exploration of GAP was to take place. This contextual perspective was informed by two literature reviews: one pertaining to the policy and legislative context, and the other to upgrading perspectives and

[3] These particular competencies were discussed in subsection 6.1.2.3 and have the potential to constitute a new category of architectural competencies.

[4] With particular attention to dialectic urbanism, as discussed in subsection 4.1.1.

local practice in relation to informal settlement upgrading. In chapter 3 the focus was narrowed to architectural practice (both on the regime level and niche level) with a critical appraisal of local architectural practice and a discussion of an emergent mode of architectural practice. Chapter 4 delineated a theoretical and analytical framework that drew attention to the phenomenon of GAP in transitions to sustainable urbanism. The chapter commenced with the development of a theoretical perspective on the notion of 'in[formal]ity' as spatial practice, after which the analytical framework of third generation AT was introduced and adapted to this notion. GAP was then posited as an intermediate conceptual tool within the framework of DWR. Three live project case studies in Cape Town were mapped in Chapter 5, informing the empirical findings that were compared and analysed in the earlier part of the current, final chapter.

Structuring the aims of the research according to the MLP framework embedded in STT provided a balance between the structure and flexibility required to conduct a phenomenological exploration of GAP in transitions to sustainable urbanism. As a multi-disciplinary extension of AT that enables empirical analyses of work activity, DWR drew together the live project case studies and the activity system framework and provided a framework that could be adapted to suit the aims of the research. This was done by incorporating the notion of 'in[formal]ity' as a dialectic whole into AT, and mapping the activity systems of residents and local government as networked around the PSO of fostering transitions to sustainable urbanism. By incorporating the notion of 'in[formal]ity' in this manner, GAP could then be construed as an activity that is diffused across these two networked activity systems. The subsequent mapping – both in terms of AT and the competencies and capacities that were employed in the knotworking observed during the three case studies – enabled empirical findings based on an exploration of "circumscribed spaces and times … to prepare specific actors to reach and extend themselves across a larger world and enact … possibilities of urban becoming" (Simone, 2004a: 3). As such, the research reported on in this dissertation transcends what Pieterse (2011: 5) describes as "merely collating idiosyncratic micro examples and case studies" to instead "arrive at a denser, expansive, and fuller conceptualisation" of GAP and the informal capacities that are required to address the persistent inequalities that impede the realisation of spatial justice in South Africa.

Both Combrinck (2015: iii) and Massey (2013b: 186) identify the need for further research on architectural practice in relation to informal settlement upgrading. In her doctoral dissertation, Massey (2013b: 179-181) notes that many aspects of residents' informal spatial practice are carried over into upgraded informal settlements, and describes such 'counter-conduct' as a result of the incorrect assumptions that local government makes regarding residents' informal spatial practice. In the research presented in this dissertation, the notion of 'in[formal]ity' provides a means of incorporating informal spatial practice into GAP so as to prevent incorrect assumptions on the part of architectural professionals. The doctoral research of Combrinck (2015: 665) addresses the marginality of architectural practice in the informal settlement upgrading discourse by evaluating the method of community action planning, developed by Goethert and Hamdi (1997), as a platform for architectural professionals to engage with informal settlement residents. In a subsequent publication on the role of architectural professionals in the *in situ*

upgrading of informal settlements, Combrinck (2017b: 38) describes the contribution of the architectural profession to the upgrading discourse as being one of grappling – by engaging in collaborative design processes – with the profession's role in sustaining the hegemony of formal spatial practice. She concludes that architectural professionals require a clear understanding of the nuances of the *in situ* upgrading discourse if they are to contribute to spatial justice. The research presented in the current dissertation contributes to a clearer understanding of such nuances by exploring the relationship between the formal and the informal (the notion of 'in[formal]ity'), and offers GAP and the informal capacities that are employed and developed in the course of such practice as a complement to Combrinck's evaluation of community action planning.

The research reported on in this dissertation does not propose the development of a new (or the application of an existing) method of engagement, but rather dwells on the competencies and capacities that are developed when architectural professionals engage with residents in support of the upgrading of their informal settlements. These informal capacities promote connections between residents, local organisations, local government, and architectural professionals, unlocking the situated knowledge of residents so that it may be employed in conjunction with that of architectural professionals in co-production and collaborative design. This enables residents to articulate their own needs and become involved in the spatial processes that impact on their lives. In turn, architectural professionals are enabled to adopt a new professional identity – one of collaborator, more than expert – that enables them to foster spatial justice from within the context where it is most needed.

6.3.2 Recommendations

As stipulated in subsection 1.4.2.4, the three live project case studies were chosen to represent a range of architectural practices. The limited scope of this research (being the doctoral research of one part-time researcher) required a compromise between the depth and breadth of the exploration. I have chosen to privilege depth – engaging with only one case study at a time, so as to fully immerse myself in the research context – at the expense of breadth. As such, if applied to a larger number of case studies with a wider range of local organisations and contexts, the two ideas that have guided the research presented in this dissertation (the notion of 'in[formal]ity' and the phenomenon of GAP) hold the potential to yield more insight into the informal capacities that architectural professionals employ in their engagements with residents in support of transitions to sustainable urbanism. As the focus of this research is on capacity building, rather than on developing a new model for architectural practice (in the belief that capacities are more suited to deal with the complexity and contingency embedded in engagements with informal spatial practice), a future step in the research trajectory would have to be an engagement with SACAP. Once sufficient empirical findings have been generated from

further case studies, SACAP's prescribed competencies may be interrogated, pointing out which are relevant to GAP, which are impediments to it, and in particular, those that are yet to be included as prescribed competencies (with particular attention being paid to those that relate to socio-technical facilitation). Furthermore, SACAP could consider the implementation of community service – similar to that required of graduates in the field of medicine prior to professional registration – as a means of fostering GAP as an emergent mode of architectural practice.

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Appendices

A Ethical clearance documentation

This appendix includes scanned copies of all the ethical clearance documentation pertaining to the empirical portion of the research reported on in this dissertation. The documentation included here follows on from the discussion of ethical considerations in subsection 1.4.1.3.

A1 Semi-structured interview form

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STELLENBOSCH UNIVERSITY
STRUCTURED INTERVIEW SCHEDULE

Informal Capacities: Exploring grounded architectural practice to support informal settlement residents' transitions toward sustainable urbanism in Cape Town

1. GENERAL QUESTIONS

What is your role in the upgrading project?
How did you become involved in the project?
Who did you work with in the project?
How does this relate to other projects which you have worked on?

The aim of these questions is to fully understand the involvement of the interviewee in the project.

2. SPECIFIC QUESTIONS

Discuss your experience of the project according to the following headings:
(note: this is to enable mapping of the activity according to cultural historical activity theory, and the different elements of this system is indicated in brackets).

1. Your own role (subject)
2. The upgrading project itself (subject)
3. The goal of the project (outcome)
4. The procedure, practices or conventions used during the project (instruments / tools)
5. The implicit or explicit codes of conduct / interaction which were followed (rules)
6. The different stakeholders or people who were involved in the project (community)
7. The way in which different people performed different roles or functions (division of labour).

The aim of this mapping is to identify contradictions between the different elements of the system, and questions will be asked to uncover these after the initial responses provided to questions 1 to 7.

A2 Interview consent forms

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STELLENBOSCH UNIVERSITY
CONSENT TO PARTICIPATE IN RESEARCH

Informal Capacities: Exploring grounded architectural practice to support informal settlement residents' transitions toward sustainable urbanism in Cape Town

You are asked to participate in a research study by Rudolf Perold, from the Faculty of Architecture and Art at Hasselt University and the Department of Geography and Environmental Studies at Stellenbosch University. You were selected as a possible participant in this research study because of your participation in the CPUT co-design live project at the Light House, Lwazi Park or Lotus Park.

1. PURPOSE OF THE STUDY

The study is designed to explore the collaborative design process in informal settlement upgrading. The research study will compare three different projects to identify common patterns.

2. PROCEDURES

If you volunteer to participate in this study, we would ask you to do the following:

1. Take part in an individual semi-structured interview with the researcher, Rudolf Perold. The interview will be recorded for transcription purposes, and will then be used to inform the research study. The recording will not be used in any other way without your written permission, and you may remain anonymous if you wish.
2. Take part in a follow-up interview with the researcher to obtain your opinion on the conclusions reached on the basis of your initial interview.

3. POTENTIAL RISKS AND DISCOMFORTS

Not applicable.

4. POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY

There is no direct personal benefit to yourself as research participant. The research study as a whole will contribute to ongoing research at South African universities with regards to addressing the marginality of architectural practice in informal settlements.

5. PAYMENT FOR PARTICIPATION

There is no payment for participation in this research study.

6. CONFIDENTIALITY

Any information obtained in during this research study that can be identified with you will remain confidential unless you provide permission for your name to be used in the dissertation and academic publications based on the research study.

Other than for transcription for personal use by the researcher, the recording of the semi-structured and follow-up interviews will not be used in any other way without your written permission, and you may remain anonymous if you wish.

7. PARTICIPATION AND WITHDRAWAL

You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. You may also refuse to answer any questions you don't want to answer and still remain in the study. The researcher may withdraw you from this research if circumstances arise which warrant doing so.

8. IDENTIFICATION OF RESEARCHER

If you have any questions or concerns about the research, please feel free to contact Rudolf Perold at: Tel (W): 021 440 2236 Tel (M): 084 484 4484
Office address: 10.16, Media City Building, cnr Heerengracht and Hertzog Blvd, Cape Town 8000
Email: peroldr@cput.ac.za

9. RIGHTS OF RESEARCH SUBJECTS

You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you have questions regarding your rights as a research subject, contact Ms Maléne Fouché [mfouche@sun.ac.za; 021 808 4622] at the Division for Research Development.

SIGNATURE OF RESEARCH SUBJECT OR LEGAL REPRESENTATIVE

The information above was described to me by Rudolf Perold in English and I am in command of this language or it was satisfactorily translated to me. I was given the opportunity to ask questions and these questions were answered to my satisfaction.

I hereby consent voluntarily to participate in this study. I have been given a copy of this form.

DENSIL FAURE
Name of Participant

I wish to remain anonymous: ~~Yes~~ / No

17 MAY 2016
Signature of Participant **Date**

I give permission for my name to be used in the dissertation and academic publications based on the research study: Yes / ~~No~~

SIGNATURE OF INVESTIGATOR

I declare that I explained the information given in this document to Densil Faure [name of participant]. He / ~~she~~ was encouraged and given ample time to ask me any questions. This conversation was conducted in English and no translator was used.

Signature of Investigator

17.05.2016
Date

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I hereby consent voluntarily to participate in this study. I have been given a copy of this form.

ADITYA KUMAR
Name of Participant

I wish to remain anonymous: Yes / (No)

Signature of Participant

2.6.2016
Date

I give permission for my name to be used in the dissertation and academic publications based on the research study: (Yes) / No

SIGNATURE OF INVESTIGATOR

I declare that I explained the information given in this document to Aditya Kumar [name of participant]. He / she was encouraged and given ample time to ask me any questions.

This conversation was conducted in English and no translator was used.

Signature of Investigator

2.6.2016
Date

Other than for transcription for personal use by the researcher, the recording of the semi-structured and follow-up interviews will not be used in any other way without your written permission, and you may remain anonymous if you wish.

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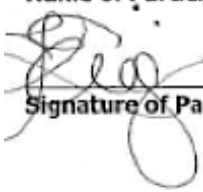
I hereby consent voluntarily to participate in this study. I have been given a copy of this form.

KATHRYN EWING
Name of Participant

I wish to remain anonymous: ~~Yes~~ / No

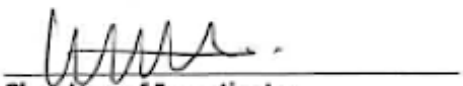


10/06/2016
Signature of Participant **Date**

I give permission for my name to be used in the dissertation and academic publications based on the research study: Yes / ~~No~~

SIGNATURE OF INVESTIGATOR

I declare that I explained the information given in this document to Kathryn Ewing [name of participant]. He / she was encouraged and given ample time to ask me any questions. This conversation was conducted in English and no translator was used.



Signature of Investigator

10-6-2016
Date

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I hereby consent voluntarily to participate in this study. I have been given a copy of this form.

Andile Mayisha
Name of Participant

I wish to remain anonymous: Yes / No

Signature of Participant 10/06/16 Date

I give permission for my name to be used in the dissertation and academic publications based on the research study: Yes / No

SIGNATURE OF INVESTIGATOR

I declare that I explained the information given in this document to Andile Mayisha [name of participant]. He / she was encouraged and given ample time to ask me any questions. This conversation was conducted in English and no translator was used.

Signature of Investigator

10-06-2016
Date

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I hereby consent voluntarily to participate in this study. I have been given a copy of this form.

Stephanie Potgieter
Name of Participant

I wish to remain anonymous: [redacted] / No

Signature of Participant 10/06/2016 **Date**

I give permission for my name to be used in the dissertation and academic publications based on the research study: Yes / [redacted]

SIGNATURE OF INVESTIGATOR

I declare that I explained the information given in this document to Steph Potgieter [name of participant]. He / she was encouraged and given ample time to ask me any questions. This conversation was conducted in English and no translator was used.

Signature of Investigator

10-6-2016
Date

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I hereby consent voluntarily to participate in this study. I have been given a copy of this form.

BUNITA KOHLER
Name of Participant

I wish to remain anonymous: Yes / (No)

Signature of Participant **Date** 19/7/2016

I give permission for my name to be used in the dissertation and academic publications based on the research study: (Yes) / No

SIGNATURE OF INVESTIGATOR

I declare that I explained the information given in this document to Bunita Kohler.
[name of participant]. He / she was encouraged and given ample time to ask me any questions.
This conversation was conducted in English and no translator was used.

Signature of Investigator

19.7.2016
Date

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SIGNATURE OF RESEARCH SUBJECT OR LEGAL REPRESENTATIVE

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I hereby consent voluntarily to participate in this study. I have been given a copy of this form.

Margot Mullet
Name of Participant

I wish to remain anonymous: Yes / (No)

Signature of Participant **Date** 28/07/2016

I give permission for my name to be used in the dissertation and academic publications based on the research study: (Yes) / No

SIGNATURE OF INVESTIGATOR

I declare that I explained the information given in this document to Margot Mullet [name of participant]. He / she was encouraged and given ample time to ask me any questions. This conversation was conducted in English and no translator was used.

Signature of Investigator

28.07.2016.
Date

Other than for transcription for personal use by the researcher, the recording of the semi-structured and follow-up interviews will not be used in any other way without your written permission, and you may remain anonymous if you wish.

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SIGNATURE OF RESEARCH SUBJECT OR LEGAL REPRESENTATIVE

The information above was described to me by Rudolf Perold in English and I am in command of this language or it was satisfactorily translated to me. I was given the opportunity to ask questions and these questions were answered to my satisfaction.

I hereby consent voluntarily to participate in this study. I have been given a copy of this form.

SIYAMBOLEKA JAMES
Name of Participant

I wish to remain anonymous: Yes / (No)

S. J James 18/05/2017
Signature of Participant **Date**

I give permission for my name to be used in the dissertation and academic publications based on the research study: (Yes) / No

SIGNATURE OF INVESTIGATOR

I declare that I explained the information given in this document to Siyamboleka James [name of participant]. He / she was encouraged and given ample time to ask me any questions. This conversation was conducted in English and no translator was used.

Signature of Investigator

18/05/17
Date

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I hereby consent voluntarily to participate in this study. I have been given a copy of this form.

BARRY LEWIS
Name of Participant

I wish to remain anonymous: Yes / (No)

Signature of Participant

18.05.17
Date

I give permission for my name to be used in the dissertation and academic publications based on the research study: (Yes) / No

SIGNATURE OF INVESTIGATOR

I declare that I explained the information given in this document to Barry Lewis
[name of participant] (He) / she was encouraged and given ample time to ask me any questions.
This conversation was conducted in English and no translator was used.

Signature of Investigator

18·05·2017
Date

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I hereby consent voluntarily to participate in this study. I have been given a copy of this form.

Gugulethu Mago
Name of Participant

I wish to remain anonymous: ~~Yes~~ / No

Signature of Participant **Date** 18/06/2017

I give permission for my name to be used in the dissertation and academic publications based on the research study: Yes / ~~No~~

SIGNATURE OF INVESTIGATOR

I declare that I explained the information given in this document to Gugulethu Mago [name of participant]. He / she was encouraged and given ample time to ask me any questions. This conversation was conducted in English and no translator was used.

Signature of Investigator

15.6.2017
Date

A3 Journal consent forms

UNIVERSITEIT·STELLENBOSCH·UNIVERSITY
jou kennisvennoot • your knowledge partner

STELLENBOSCH UNIVERSITY
CONSENT TO PARTICIPATE IN RESEARCH

Informal Capacities: Exploring grounded architectural practice to support informal settlement residents' transitions toward sustainable urbanism in Cape Town

You are asked to participate in a research study by Rudolf Perold, from the Faculty of Architecture and Art at Hasselt University and the Department of Geography and Environmental Studies at Stellenbosch University. You were selected as a possible participant in this research study because of your participation in the CPUT co-design live project at the Light House, Lwazi Park or Lotus Park.

1. PURPOSE OF THE STUDY

The study is designed to explore the collaborative design process in informal settlement upgrading. The research study will compare three different projects to identify common patterns.

2. PROCEDURES

If you volunteer to participate in this study, we would ask you to do the following:

1. To give permission for the researcher, Rudolf Perold, to make use of the reflective journal which you wrote during your participation in the project. The journal will be used to inform the research study, and will not be used in any other way without your written permission. You may remain anonymous if you wish.

3. POTENTIAL RISKS AND DISCOMFORTS

Not applicable.

4. POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY

There is no direct personal benefit to yourself as research participant. The research study as a whole will contribute to ongoing research at South African universities with regards to addressing the marginality of architectural practice in informal settlements.

5. PAYMENT FOR PARTICIPATION

There is no payment for participation in this research study.

6. CONFIDENTIALITY

Any information obtained in during this research study that can be identified with you will remain confidential unless you provide permission for your name to be used in the dissertation and academic publications based on the research study. The journal will not be used in any other way without your written permission, and you may remain anonymous if you wish.

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I hereby consent voluntarily to participate in this study. I have been given a copy of this form.

MONGEZI MSOMI
Name of Participant

I wish to remain anonymous: Yes / (No)

Signature of Participant **Date** 06/04/'15

I give permission for my name to be used in the dissertation and academic publications based on the research study: (Yes) No

SIGNATURE OF INVESTIGATOR

I declare that I explained the information given in this document to Mongezi MSomi [name of participant]. He / she was encouraged and given ample time to ask me any questions. This conversation was conducted in English and no translator was used.

Signature of Investigator

6-4-2015
Date

Memorandum of Understanding

Between

The Informal Settlement Network

a network of representatives of residents of informal settlements and backyards at metropolitan level in South Africa that is committed to partnering with government in the incremental improvement of informal settlements and backyard precincts and the improvement of livelihood opportunities for their residents;

Community Organization Resource Centre (CORC)

a Non Profit Organisation with Social Development Reg. 017659

And

CPUT Department of Architectural Technology

(Design Build Research Studio)

(Hereinafter collectively referred to as the "Parties" and individually as the "Party")

Purpose of the partnership

To collaborate and maximize technical support towards a partnership between ISN, CORC and CPUT Department of Architectural Technology (Design Build Research Studio), that aims to assist communities within informal settlements achieve community owned and driven development processes. The partnership aims to ensure a holistic and collaborative approach that will at all times encourage community participation wherever possible and keep as its central focus, that the residents of informal settlements shall be the determinants of their own development agenda

Nature of the Partnership

The parties are entering into this MOU on the basis that we are equal partners who bring different and yet complementary strengths to the tasks - equally sharing risks and benefits associated with project.

The parties commit themselves to the common goal of jointly delivering to the highest level of quality and establishing a working relationship that is underpinned by principles of transparency and trust.

Responsibilities of all parties in the partnership

Within this project, both partners will work within the Memorandum of Understanding (MoU) established to promote the joint aims of the partnership.

The parties will hold joint meetings at mutually agreeable times (but at least once per month) to review progress with the project and assess further ways in which the common goals can be implemented.

Working within the broader MoU, the Parties will assume specific responsibilities:

ISN shall undertakes to:

- Mobilise communities and stimulate them to take action towards people-led upgrading initiatives;
- Mobilise financial contribution from beneficiaries and capacitate them in managing collective financial resources;
- Organise and facilitate a genuine people's dialogue with the authorities and new partners, in particular CPUT Department of Architectural Technology (Design Build Research Studio);
- Provide the space and focus on learning by fellow slum-dwellers visiting project activities (including preparation phases, negotiation, etc.) from other neighbourhoods, towns and countries;

CORC undertakes to:

- Support and facilitate the partnership between ISN, informal settlement dwellers and CPUT Department of Architectural Technology (Design Build Research Studio) in terms of structuring the regular constructive dialogue platforms, refining the objectives and the results in a Learning, M&E framework suitable for the social movement and for the specific project, organizing the technical work on the ground according to basic project management principles.
- Support ISN and City in the communication strategy around the pilot project, in coordination with HFHSA;

CPUT Department of Architectural Technology (Design Build Research Studio) shall undertake to:

- Ensure availability for regular partnership meetings with ISN, CORC and the communities involved in the project.
- Provide the students, incl. transport costs, and manage their academic learning process.
- Undertake mapping and analysis of the selected areas of intervention, and prepare concept designs and layouts. These will also be documented and made available to the community and CORC.

General

The Parties shall be entitled to use the name and/or either Party's logo for purposes of the Project, and on the websites of the respective organizations, with the written consent of that Party. During the course of the Project, Parties shall use appropriate citations as mutually agreed upon.

CORC, ISN and CPUT Department of Architectural Technology (Design Build Research Studio) will review activities of such joint venture at agreed routine intervals to develop a deeper understanding of what strategies are mutually effective and what aspects of collaboration face difficulties with a view to strengthen this partnership.

Dispute Resolution
Any dispute, arising from, or in connection with this agreement shall first be resolved by the parties amicably through the process of negotiation or mediation.

If the dispute cannot be resolved, then the dispute can be referred to an arbitrator agreed on by all Parties.

Example of guiding principles
1. The project has to benefit the community
2. The community should lead the process
3. Identified community members (community architects) appointed by the community will work alongside the students as equals
4. Consultation with the broader community needs to take place on a weekly basis around the scope and the sharing of ideas
5. Ideas that emanate from the community needs to be captured and conveyed in the work that the students do
6. The work that is produced needs to further the aims and identified priorities of the community – once the students leave the community needs to be left with something they can follow up on that leads to implementation

The role of the NGO in this engagement/partnership is to ensure the above

Signed on behalf of the Parties:

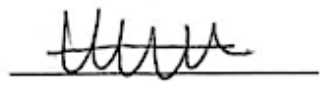
The Informal Settlement Network Community Organization Resource Centre (CORC)

Aditya Kumar

10 March 2015

CPUT Department of Architectural Technology (Design Build Research Studio)

Rudolf Perold



10 March 2015

Memorandum of Understanding between

Violence Prevention through Urban Upgrading (VPUU)

And

Cape Peninsula University of Technology (CPUT)

(VPUU_CPUT MoU 2016)

April 2016

and the 6 work-streams (cultural/social; economic; institutional; safety and security; infrastructure; and monitoring and evaluation) of the Community Action Plan (CAP), help guide the urban design of the Draft Spatial Reconfiguration Plan (SRP) or Development Framework (DF) as it is known in Planning terminology.

The following provides a break-down of work conducted by the VPUU Situational Crime Prevention: Built Environment Workstream for the design and development of the SRP over the past few years:

- *Background information* – existing zoning and exiting land use have been investigated; existing services have been investigated with minimal information supplied by CoCT Line Departments in terms of location of services. All water taps, toilets, electricity and street lighting have been GPS mapped on site.
- *Policy analysis* – on-going policy and framework analysis forms part of a guiding factor for future development e.g. IDP, National level Outcome 8, Housing Code, District Plan etc.
- *Baseline Survey* – understanding the spatial implications of the baseline findings
- *Contextual Analysis* – Strategic on-site GPS collation of institutions and localised tracks and pathways were mapped to guide the reconfiguration plan. Points of special interest, known as 'celebration points' (of differing scales) were mapped on site and were key informants to guide the public structure (i.e. defined public spaces for upgrade or detailed intervention) for the SRP.
- Based on the elements of the draft SRP on-going *engagement with various stakeholders* was conducted during 2012 to current. The input from such interaction allowed a Draft SRP to develop options and trade-offs for development opportunities (based on the 6 workstreams of the CAP and 6 layers of the DF). There have been workshops and meetings with CoCT departments, SNAC, mass meetings with the LP community, and other interaction with Social Crime Prevention partners and other representatives/interested stakeholders.
- *Draft SRP* – A Draft SRP Plan was workshopped with SNAC in July 2012. This plan was presented to CoCT spatial departments (SPUD and P&BDM) in February 2013.
- *Engineering technical service layers* i.e. transport, sanitation, water, solid waste, emergency is outstanding and seen as a crucial element to further develop the SRP.
- *Discussions regarding Legal Planning and Environmental NEMA requirements*, July 2012 and May 2013.
- *Precinct Plan* – a draft precinct plan was developed with the SNAC through a series of workshops during 2012 to locate a Neighbourhood Centre (NHC).
- *Neighbourhood Centre* – the local NHC was been completed in July 2014 and has recently been occupied. A formal opening was conducted in November 2014.
- *Hard court* – a combined hard-court sports play area was developed and opening in February 2015. Additional flood lights were implemented to extend the 'playing' hours.
- *An Early Childhood Development (ECD) Hub* – is currently being designed.
- *Public space or 'Emthonjeni'* – remains a core focus of the upgrade of the public realm in Lotus Park.

Note: The above has not provided a break-down of Social, Institutional, Community Participation, Knowledge Management or Project Management Workstream activities within Lotus Park.

3. CPUT

The project forms part of CPUT's BTech Architectural Technology curriculum. The specific intention of the project is to expose students to a real-life project in an informal settlement, where they have to navigate the complexities of working with a group of residents to co-design an intervention. This process includes the establishment of a project brief, as well as the construction of the intervention.

This project follows on from a three year partnership with CORC, where similar projects were undertaken. The construction work will be coordinated by the Design Build Research Studio in the Department of Architectural technology and Interior Design at CPUT, which has five years' worth of experience with timber construction by students.

4. SCOPE OF WORK

The partnership between VPUU and CPUT hereby forms a collaborative working relationship to develop the following item related to the implementation of the Spatial Reconfiguration Plan component of an appropriate spatial intervention. This reads as the 'Scope of Works'.

The following programme was developed by CPUT and VPUU during the month of March 2016 as follows:

Thursday 7 April: Site Visit to Lotus Park
Site visit to Lotus Park Neighbourhood Centre and brief hand-out. The intent is for the students to familiarise themselves with the work which VPUU and the community have done to date, and with the settlement and its general context. It would ideal to have some discussions with VPUU staff and possibly community representatives about the public space intervention which we will be co-designing and building. The visit will could also feed into an Urban Design level of involvement.

Monday 11 April to Friday 6 May (4 weeks): Catalyst intervention co-design
The **first two weeks** of this process will involve co-design between four or five student groups and community representatives (on site and in studio) of a small public space intervention. It is important that this be rooted in the existing planning, so maybe the position and function could be negotiated as the first part of the co-design process. The community reps can then choose their preferred design after two weeks.

The **second two weeks** will involve the technological development and documentation of the preferred design, in studio (community engagement not necessary at this stage). Each student group can focus on a different part of the structure / aspect of the construction process.

Monday 23 May to Friday 3 June (2 weeks): Catalyst intervention construction
Construction of the selected catalyst intervention, making use of local labour with VPUU Emthonjeni Construction Team for wet works and student labour for timber construction. This strategy can also be developed as part of the technological development of the intervention.

Note: all dates are subject to change

5. DURATION

Performance under this Understanding shall commence in **07 April 2016** and shall continue until the estimated completion **03 June 2016** with the possibility of extension under terms which are mutually agreed upon in writing by the Parties or extension of work thereof.

6. PROJECT CO-ORDINATION AND TECHNICAL SUPERVISION

a. CPUT's coordinator for the Project shall be Rudolf Perold, in his capacity as coordinator of the Design Build Research Studio (DBRS), with assistance from Hermie Delport-Voulgarelis (fellow DBRS coordinator) and BTech lecturers.
b. VPUU's Project Manager for the Project shall be Kathryn Ewing, acting as Workstream Leader for Planning and Design, Situational Crime Prevention, with assistance from

different VPUU NPC Workstream Coordinators from Built Environment, Project Management and Social Crime Prevention.

c. Co-ordination of the Project is to be carried out by decision making through mutual consultation and agreement as per roles and responsibilities agreed within this Understanding.

7. RESPONSIBILITIES OF CPUT

CPUT will facilitate the student involvement in the process, and take responsibility for the academic outcomes of the students' involvement in the project. CPUT staff, through the Design-Build Research Studio (DBRS), will coordinate the co-design and co-construction process of a public space in Lotus Park Informal Settlement in Gugulethu.
In this regard, the following will be provided by CPUT:

- Take the lead in the facilitating of co-design and co-construction site sessions in Lotus Park Neighbourhood Centre Precinct (e.g. venue as LP Neighbourhood Centre, informing community representatives, local leadership and other stakeholders) – dates to be finalised during the programme;
- CPUT will provide R40 000 funding available for material (this funding is part of an existing NRF Thuthuka grant awarded to Rudolf Perold, in part for the purpose of procuring material for this project).
- Procure materials for construction through normal CPUT procedure for CPUT funded elements;
- CPUT will provide bus transport for students to Lotus Park on specified days (funding has been obtained through CPUT Service Learning Department).
- CPUT will provide a Health and Safety Induction for students who take part in the construction of the public space intervention (the cost of this will form part of the R40 000 funding from the NRF).
- Guide the construction of timber and steel elements by students and local labour of the public space intervention.

8. RESPONSIBILITIES OF VPUU

VPUU will facilitate the process on site in Lotus Park. The focus of the work based in this Memorandum of Understanding will be a series of workshops with the community representatives, CPUT and VPUU staff as a co-design and co-construction process of a public space in Lotus Park Informal Settlement in Gugulethu. In this regard, the following will be provided by VPUU:

- Facilitate and host the site visit in Lotus Park on 07 April 2016 (including informing local leadership, finding community representatives who are willing to be involved in the process);
- Provide all relevant material and background information to assist the process;
- Assist in the facilitation of co-design and co-construction site sessions in Lotus Park Neighbourhood Centre Precinct (e.g. venue as LP Neighbourhood Centre, informing community representatives, local leadership and other stakeholders) – dates to be finalised during the programme;
- Facilitate transport for community representatives to and from Lotus Park and CPUT studio on specified days;
- VPUU will provide at least R40 000 funding available for material and local labour for public space intervention (additional funding to be reviewed in the process)
- Procure materials for construction through normal VPUU procedure for VPUU funded elements;

- Guide the wet works development with the Emthonjeni Construction Team and local labour of the public space intervention

9. ADHERENCE TO PLAN/FRAMEWORKS/PROJECTS IN PLACE IN LOTUS PARK

The Project must adhere to the current Community Action Plan (CAP), Spatial Reconfiguration Plan (SRP) and related strategies and projects, as set up by SNAC and VPUU and part of the Programme.

10. PROJECT COSTS

Each Party to this Memorandum of Understanding will bear their own costs where relevant other than the specified project amount for intervention:

a. Any change in costs needs to be discussed between both Parties and any amendments are to be provided in writing and agreed between both Parties.
b. Any delays in the Project (i.e. departures from the timeframes) will be recorded and appropriate mitigation measures taken by the Parties.

11. DISPUTE RESOLUTION

In the event of any disagreement which may arise pursuant to this Understanding and prior to the commencement of any formal proceedings, the Parties shall attempt in good faith to reach a negotiated resolution by designating an officer of appropriate authority to resolve the dispute and by recourse to whatever means they deem appropriate, including the use of technical, legal, accounting or other experts. Each Party will bear its own costs in relation to such expertise as applicable. In the event that the Parties fail to resolve their dispute as aforesaid, either Party may refer the dispute to mediation.

a. **Mediation**

Should any dispute of whatsoever nature which has arisen between the Parties concerning this Memorandum of Understanding not reach a negotiated resolution between the Parties, such dispute shall be referred to a Mediation Committee comprising the executive authorities of both Parties or capacities similar thereto.

The Mediation Committee shall meet within 14 (fourteen) days of the date on which such a dispute is declared, and shall attempt to resolve the dispute by mediation.

If the Mediation Committee is unable to settle the dispute within a further 14 (fourteen) days, the dispute shall be referred to Arbitration for resolution, as recorded in item 7.2 below.

b. **Arbitration**

Should any dispute of any nature whatsoever not be resolved through Mediation as recorded in item 10a above, then at the election of any Party, such a dispute shall be finally resolved in accordance with the rules of the Arbitration Foundation of Southern Africa (AFSA) by an arbitrator or arbitrators appointed by AFSA.

12. LIABILITIES AND INDEMNIFICATION

Each of the Parties (each an Indemnifying Party) shall keep the other Party(ies) (each an Indemnified Party), both during and after the term of this Understanding, fully and effectively indemnified against all losses, damage, injuries, deaths, expenses, actions, proceedings, demands, costs and claims, including but not limited to legal fees and expenses suffered by the Indemnified Party or any third party where such loss, damage, injury or death is the result of any negligent act or omission of the Indemnifying Party or any of its Representatives.

13. INTELLECTUAL PROPERTY

a. **Current VPUU Work:** The broader VPUU work, strategy and methodology, including the Spatial Reconfiguration Plan and related information that have been conducted and developed by VPUU are the intellectual property of VPUU. CPUT is able to use this information for the purposes of resource content and any use of this information in other circumstances will be subject to written approval from both Parties.

b. **Work material:** All work (hard or soft materials) produced during the Project for presentation/papers/workshops/academic conferences and the like by all Parties are to be specific to the Project at hand *'Lotus Park – Catalyst Intervention through co-design and co-production of a public space'*. Any use of this information in other circumstances will be subject to written approval from both Parties.

c. **Ownership of project outcomes:** Any and all information, thoughts, concepts, inventions, designs, improvements, works and/or any documentation produced in the course of the project providing technical assistance and advisory services to VPUU shall be the property of both Parties to this Memorandum of Understanding collectively.

14. GOVERNING LAW

This Memorandum of Understanding, its meaning and interpretation, and the relation between the Parties, shall be governed by South African Law.

15. MODIFICATION

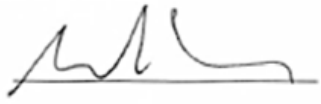
No amendment or variation of the terms and conditions of this Memorandum of Understanding in any form or manner whatsoever shall be recognised by or be binding upon the Parties, unless such amendment or variation has been embodied in a written agreement duly executed by authorised signatories of the Parties.

16. ENTIRE UNDERSTANDING

This Memorandum of Understanding contains all the express provisions agreed on by the Parties and the Parties waive the right to rely on any alleged express provision not contained in this Memorandum of Understanding.

SIGNED at CAPE TOWN on this the 05 day of APRIL 2016.

For and on behalf of **VPUU NPC**

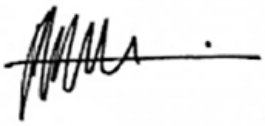
Signature: 

Name: MICHAEL KRAUSE

Designation: CEO VPUU NPC

SIGNED at Cape Town on this the 4th day of March 2016.

For and on behalf of **CPUT**

Signature: 

Name: Rudolf Perold

Designation: Senior lecturer and DBRS coordinator

Memorandum of Understanding between

Ubuhle Bakha Ubuhle (UBU)
and
CPUT Department of Architectural Technology
(Design Build Research Studio)

(Hereinafter collectively referred to as the "Parties" and individually as the "Party")

Purpose of the partnership
To collaborate towards a partnership between UBU and the CPUT Department of Architectural Technology (Design Build Research Studio), that aims to assist the community of Sweet Home Farm to explore the adaptation of the process house typology into a clinic typology. The partnership aims to ensure a holistic and collaborative approach.

Nature of the Partnership
The parties are entering into this MOU on the basis that we are equal partners who bring different and yet complementary strengths to the tasks – equally sharing risks and benefits associated with project. The parties commit themselves to the common goal of jointly delivering to the highest level of quality and establishing a working relationship that is underpinned by principles of transparency and trust.

Responsibilities of all parties in the partnership
Within this project, both partners will work within the Memorandum of Understanding (MoU) established to promote the joint aims of the partnership. Working within the broader MoU, the Parties will assume specific responsibilities:

UBU undertakes to:
- Support and facilitate the partnership between and CPUT Department of Architectural Technology (Design Build Research Studio) in terms of structuring the regular constructive dialogue platforms in the CPUT studio.

CPUT Department of Architectural Technology (Design Build Research Studio) shall undertake to:
- Ensure availability for regular partnership meetings with UBU and the community involved in the project.
- Provide the students, incl. transport costs, and manage their academic learning process.
- Develop a clinic typology based on the process house typology. These will also be documented and made available to the community and CORC.

General
The Parties shall be entitled to use the name and/or either Party's logo for purposes of the Project, and on the websites of the respective organizations, with the written consent of that Party. During the course of the Project, Parties shall use appropriate citations as mutually agreed upon. UBU and CPUT Department of Architectural Technology (Design Build

Research Studio) will review activities of such joint venture at agreed routine intervals to develop a deeper understanding of what strategies are mutually effective and what aspects of collaboration face difficulties with a view to strengthen this partnership.

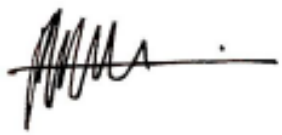
Dispute Resolution
Any dispute, arising from, or in connection with this agreement shall first be resolved by the parties amicably through the process of negotiation or mediation.
If the dispute cannot be resolved, then the dispute can be referred to an arbitrator agreed on by all Parties.

Example of guiding principles
1. The project has to benefit the community.
2. The community should lead the process.
3. Identified community members appointed by the community will work alongside the students as equals.
5. Ideas that emanate from the community needs to be captured and conveyed in the work that the students do.
6. The work that is produced needs to further the aims and identified priorities of the community – once the students leave the community needs to be left with something they can follow up on that leads to implementation. The role of the NGO in this engagement/partnership is to ensure the above.

Signed on behalf of the Parties:

Barry Lewis
UBU

Date: 10 April 2017



Rudolf Perold
CPUT (DBRS)

Date: 10 April 2017

A5 Institutional consent

Cape Peninsula
University of Technology

P.O. Box 652 • Cape Town 8000 South Africa •Tel: +27 21 469 1012 • Fax +27 21 469 1002
80 Roeland Street, Vredehoek, Cape Town 8001

Office of the Research Ethics Committee	Faculty of Informatics and Design

At a meeting of the Faculty Research Ethics Committee, ethical clearance was granted to MR RUDOLF PEROLD for research activities related to his Doctor of Philosophy degree in Architecture at the University of Stellenbosch. Mr Perold intends collecting his research data in the Department of Architectural Technology at Cape Peninsula University of Technology and will require consent in principle from the CPUT management.

Title thesis:	Informal Capacities: Exploring grounded architectural practice in transitions to sustainable urbanism

Comments

Research activities are restricted to those detailed in the research proposal.

Signed: Faculty Research Ethics Committee	Date
	16/8/2016

RESEARCH ETHICS COMMITTEE
INFORMATICS AND DESIGN
ETHICS APPROVAL GRANTED
16 AUG 2016
Cape Peninsula
University of Technology

Cape Peninsula University of Technology

Office of the Deputy Vice Chancellor:
Research, Technology Innovation & Partnerships
Bellville Campus
P O Box 1906
Bellville 7535
Tel: 021-9596242
Email: [illegible]

16 August 2016

Mr Rudolf Perold
PO Box 652,
Cape Town
8001

Email: peroldr@cput.ac.za

Dear Mr Rudolf Perold

RE: PERMISSION TO CONDUCT RESEARCH AT CPUT

The Institutional Ethics Committee received your application entitled "Informal Capacities: Exploring grounded architectural practice in transitions to sustainable urbanism", together with the dossier of supporting documents.

Permission is herewith granted for you to do research at the Cape Peninsula University of Technology.

Wishing you the best in your study.

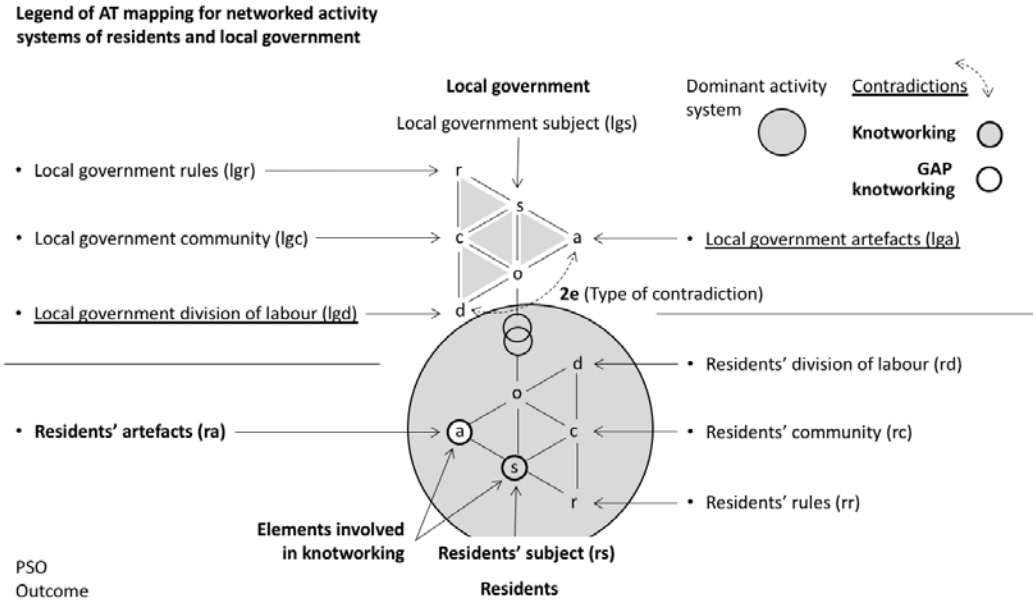
Sincerely

APPROVED
Chair Senate Ethics Committee
16 AUG 2016
Cape Peninsula University of Technology
Signature: .....

PO Box 1906 Bellville 7535 South Africa
086 123 2788

B Case mapping diagrams

This appendix includes a legend of AT mapping as employed in the research reported in this dissertation, as well as the individual diagrams of all of the contradictions and knots that contribute to the four instances of knotworking in each case study. Contradictions and non-GAP knots appear here alone and are cross-referenced in the text of the narrative description (e.g. LWP1a), while the diagrams of knots that pertain to GAP are included in the narrative description (Chapter 4) as figures. All diagrams are by the author.

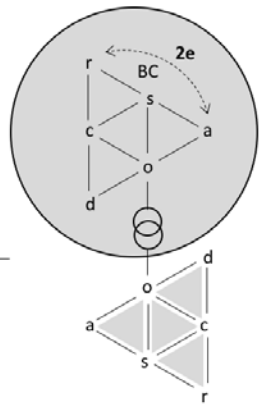


Contradiction LWP1a:
Consultant's layout rejected

Local government

- No residents moved to peripheral TRA

- BC liaises with resident leadership
- BC prepares settlement layouts



- Conventional settlement layout
- Liaison with resident leadership

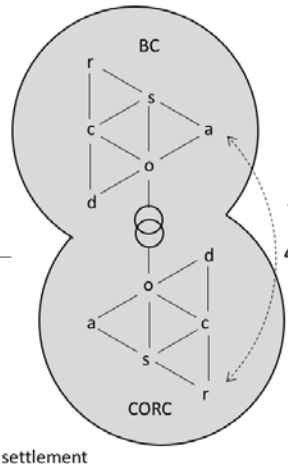
PSO: Relocation of residents
Outcome: Canal widening

Residents

Contradiction LWP1b:
Consultant's layout rejected

Local government

- BC liaises with resident leadership
- BC prepares settlement layouts



- Conventional settlement layout
- Liaison with resident leadership

- Resident leadership

- All households to be accommodated

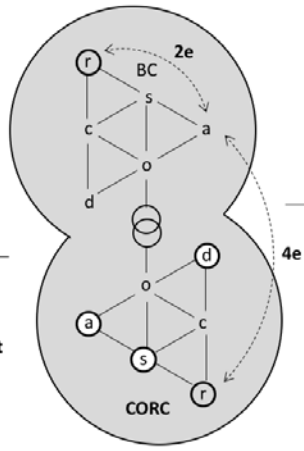
PSO: Relocation of residents → upgrading of settlement
Outcome: Canal widening → realise aspirations

Residents

Knot LWP1c:
Consultant's layout rejected

Local government

- No residents moved to peripheral TRA
- **More time allowed for participatory co-design process**



- Conventional settlement layout
- Liaison with resident leadership

- **Planning and negotiation process**
- **Knowledge of residents' aspirations**
- **Co-designed alternative settlement layout**

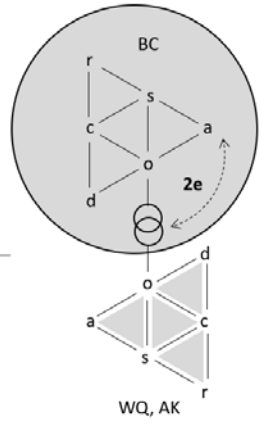
- **CORC assists resident leadership with planning and settlement layouts**
- Resident leadership
- All households to be accommodated
- **CORC allowed to assist with planning and negotiations**

PSO: Upgrading of settlement
Outcome: Realise aspirations

Residents

Contradiction LWP2a:
Co-designed layout deviates

Local government



- Services infrastructure layout

- Report on existing conditions

- WQ and resident leadership prepares report on existing conditions
- Resident leadership
- CORC
- All households to be accommodated
- Respect contours and existing pathways
- Varying plot sizes

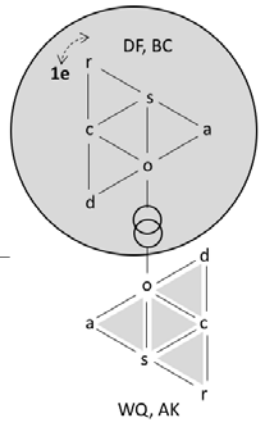
PSO: Co-designed alternative settlement layout
Outcome: Upgrading of settlement

Residents

Contradiction LWP2b:
Co-designed layout deviates

Local government

- More time allowed for co-design process
- Fixed timeline of canal widening project
- UISD
- Roads and Stormwater Department
- Various COCT departments
- DF and BC liaise with AK and resident leadership



- AK facilitates resident-driven processes
- Resident leadership
- CORC

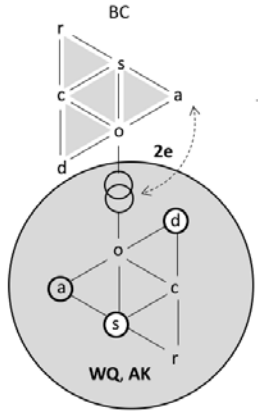
- Resident-driven processes

PSO: Co-designed alternative settlement layout
Outcome: Upgrading of settlement

Residents

Knot LWP2c:
Co-designed layout deviates

Local government



- Services infrastructure layout

- WQ and resident leadership prepares report on existing conditions
- **AK reviews co-designed alternative layout to reduce deviations from services infrastructure layout**

- Resident leadership
- CORC

- All households to be accommodated
- Respect contours and existing pathways
- Varying plot sizes

- Report on existing conditions
- **Warning of potential protest action**

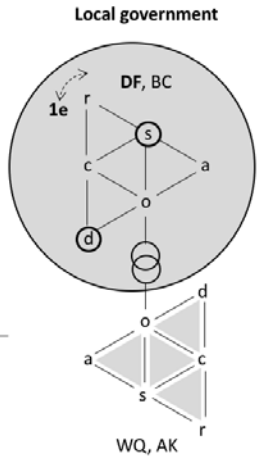
PSO: Co-designed alternative settlement layout
Outcome: Upgrading of settlement

Residents

Knot LWP2d:
Co-designed layout deviates

- More time allowed for co-design process
- Fixed timeline of canal widening project
- UISD
- Roads and Stormwater Department
- Various COCT departments
- DF and BC liaise with AK and resident leadership
- **DF mediates between AK and various COCT departments**

- Resident-driven processes

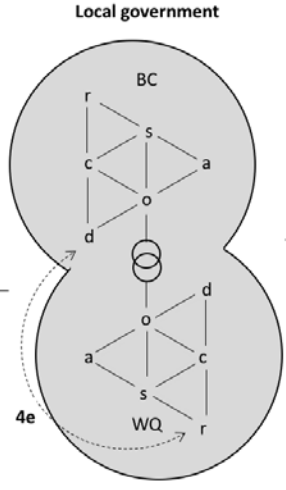


- AK facilitates resident-driven processes
- Resident leadership
- CORC

PSO: Co-designed alternative settlement layout
Outcome: Upgrading of settlement

Contradiction LWP3a:
Conflict regarding implementation

- UISD
- Roads and Stormwater Department
- BC refuses to mark out layout



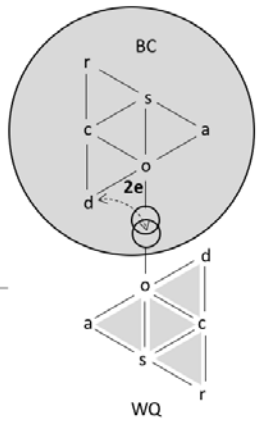
- CORC
- Co-designed layout to be implemented

PSO: Move residents to relocation site
Outcome: Settlement upgrading (residents), canal widening (local government)

Contradiction LWP3b:
Conflict regarding implementation

Local government

- UISD
- Roads and Stormwater Department
- UISD supplies truck and emergency housing kits
- BC (refuses) to mark out layout



- Truck
- Emergency housing kit

- CORC

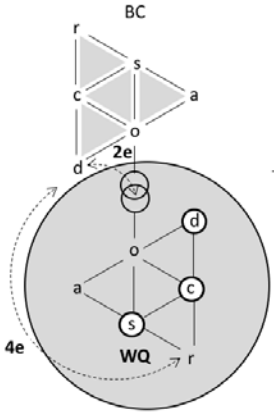
PSO: Move residents to relocation site
Outcome: Settlement upgrading (residents), canal widening (local government)

Residents

Knot LWP3c:
Conflict regarding implementation

Local government

- UISD
- Roads and Stormwater Department
- UISD supplies truck and emergency housing kits
- BC (refuses) to mark out layout



- Truck
- Emergency housing kit

- **CORC employees mark out layout**
- **WQ facilitates allocation of plots**

- **CORC**

- Co-designed layout to be implemented

PSO: Move residents to relocation site
Outcome: Settlement upgrading (residents), canal widening (local government)

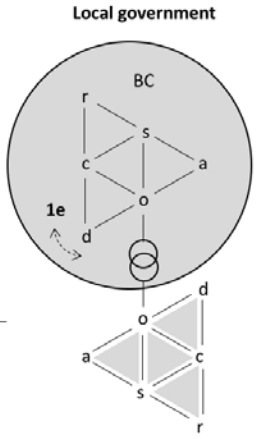
Residents

Contradiction LWP3d:
Conflict regarding implementation

- UISD
- Roads and Stormwater Department

- BC to install services infrastructure
- BC to commence with canal widening project

PSO: Move residents to relocation site
Outcome: Settlement upgrading (residents), canal widening (local government)



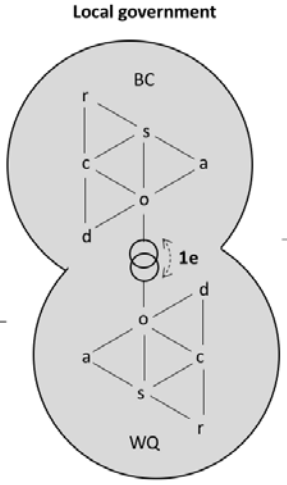
Contradiction LWP3e:
Conflict regarding implementation

- UISD
- Roads and Stormwater Department

- BC to install services infrastructure
- BC to commence with canal widening project

- CUFF funding for upgrading of dwellings

PSO: Move residents to relocation site
Outcome: Settlement upgrading (residents), canal widening (local government)



- CORC

- Co-designed layout to be implemented

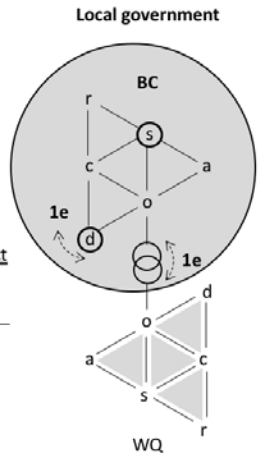
Knot LWP3f:
Conflict regarding implementation

- UISD
- Roads and Stormwater Department

- **BC installs services infrastructure**
- BC commences with canal widening project

- CUFF funding for upgrading of dwellings

PSO: Move residents to relocation site
Outcome: Settlement upgrading (residents), canal widening (local government)

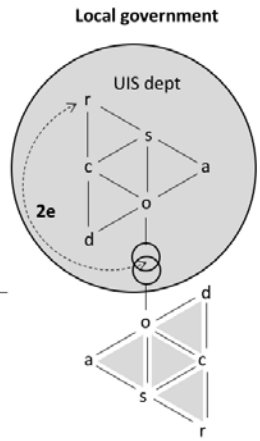


- CORC
- Co-designed layout to be implemented

Contradiction LWP4a:
Inadequate capacity for upgrading

- UISP application requires revised settlement layout and dwelling typologies

PSO: Application for UISP project
Outcome: Further upgrading of settlement



- UISP methodology

- CORC
- Medium-density incremental housing
- Co-design process

Knot LWP4b:
Inadequate capacity for upgrading

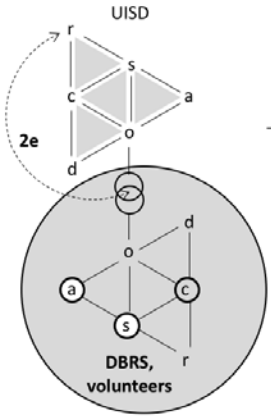
Local government

- UISP project application requires revised settlement layout and dwelling typologies

- UISD supplies cadastral maps and aerial photographs

- **Live project**
- Enumeration and mapping documentation
- Cadastral maps and aerial photographs
- **Revised settlement layout and dwelling typologies**

PSO: Application for UISP project
Outcome: Further upgrading of settlement



Residents

- UISP methodology

- CORC supplies documentation
- DBRS, WQ, SM, and DF develop brief
- DBRS and resident volunteers undertake co-design process

- **CORC**

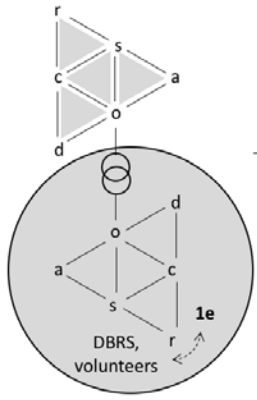
- Medium-density incremental housing
- Co-design process

Contradiction LWP4c:
Inadequate capacity for upgrading

Local government

- Live project
- Revised settlement layout and dwelling typologies

PSO: Application for UISP project
Outcome: Further upgrading of settlement



Residents

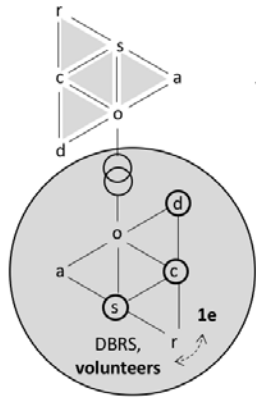
- DBRS and resident volunteers undertake co-design process

- CORC

- Medium-density incremental housing
- Co-design process
- Explore alternative technologies
- Cultural expectations

Knot LWP4d:
Inadequate capacity for upgrading

Local government



Residents

- Live project
- Revised settlement layout and dwelling typologies

PSO: Application for UISP project
Outcome: Further upgrading of settlement

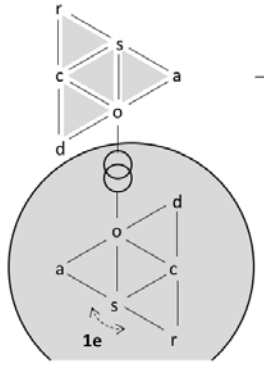
- DBRS and resident volunteers undertake co-design process
- **WQ and resident volunteers engage in peer exchanges facilitated by ISN**

- CORC
- **ISN**

- Medium-density incremental housing
- Co-design process
- Explore alternative technologies
- Cultural expectations

Contradiction LTP1a:
Architectural communication

Local government



SP, SNAC, local groups, future users

Residents

- Project brief
- Technical architectural drawings

PSO: Design of NHC
Outcome: Construction of NHC

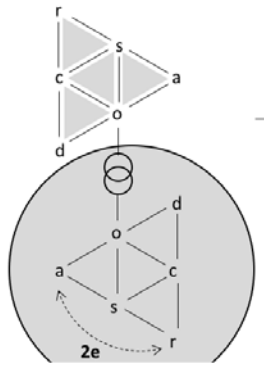
- SP, SNAC, members of local groups, and future users develop project brief
- SP, SNAC, members of local groups, and future users to co-design NHC

- Local groups
- Future users
- VPUU workstream representatives

- Co-design process
- Each iteration approved by SNAC, local groups, and future users

Contradiction LTP1b:
Architectural communication

Local government



SP, SNAC, local groups, future users

Residents

- Project brief
- Technical architectural drawings
- Presentations at SNAC meetings

PSO: Design of NHC
Outcome: Construction of NHC

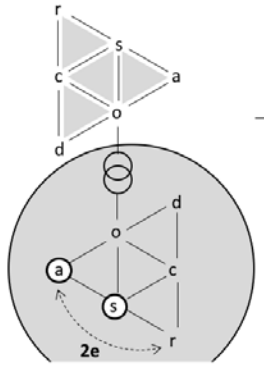
- SP, SNAC, members of local groups, and future users to co-design NHC
- SNAC consults wider stakeholder group

- Local groups
- Future users
- VPUU workstream representatives

- Co-design process
- Each iteration approved by SNAC, local groups, and future users

Knot LTP1c:
Architectural communication

Local government



SP, SNAC, local groups, future users

Residents

- Project brief
- Technical architectural drawings
- Presentations at SNAC meetings
- **Cardboard models**

PSO: Design of NHC
Outcome: Construction of NHC

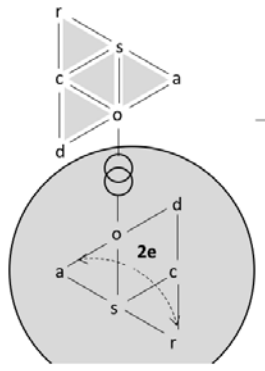
- SP, SNAC, members of local groups, and future users to co-design NHC
- SNAC consults wider stakeholder group

- Local groups
- Future users
- VPUU workstream representatives

- Co-design process
- Each iteration approved by SNAC, local groups, and future users

Contradiction LTP1d:
Architectural communication

Local government



SP, SNAC, local groups, future users

- Project brief
- Technical architectural drawings
- Presentations at SNAC meetings

- SP, SNAC, members of local groups, and future users to co-design NHC
- SNAC consults wider stakeholder group

- Local groups
- Future users
- VPUU workstream representatives

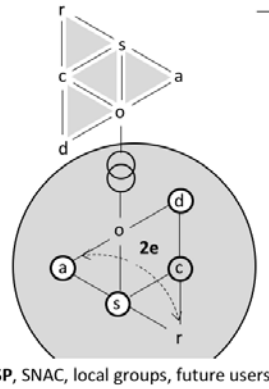
- Co-design process
- Each iteration approved by SNAC, local groups, and future users

PSO: Design of NHC
Outcome: Construction of NHC

Residents

Knot LTP1e:
Architectural communication

Local government



SP, SNAC, local groups, future users

- Project brief
- Technical architectural drawings
- Presentations at SNAC meetings
- **Cardboard models**
- **User scenarios to plan activation**

- SP, SNAC, members of local groups, and future users to co-design NHC
- SNAC consults wider stakeholder group
- **SP and VPUU workstream representatives facilitate co-design process**
- **SNAC and VPUU workstream representatives develop user scenarios to plan activation**

- **Local groups**
- **Future users**
- **VPUU workstream representatives**

- Co-design process
- Each iteration approved by SNAC, local groups, and future users

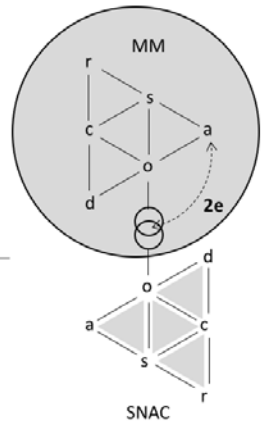
PSO: Design of NHC
Outcome: Construction of NHC

Residents

Contradiction LTP2a:
Formal approval application

Local government

- LUM & BDD



- Statutory framework and process for construction approval
- Zoning scheme (utility services)

- VPUU acts as intermediary between residents, COCT, and WCG
- VPUU to apply for construction approval

- VPUU
- SUN Development

- CAP intervention priorities

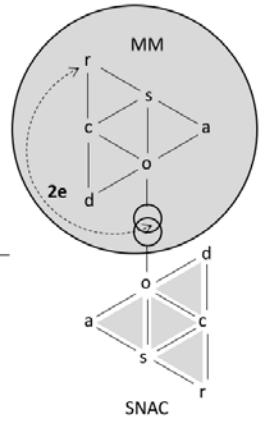
PSO: Construction of NHC
Outcome: Improved safety and facilities

Residents

Contradiction LTP2b:
Formal approval application

Local government

- Zoning scheme does not allow permanent structure of a public nature
- LUM & BDD



- Statutory framework and process for construction approval
- Zoning scheme (utility services)

- VPUU acts as intermediary between residents, COCT, and WCG
- VPUU to apply for construction approval

- Partnership with COCT

- VPUU
- SUN Development

- CAP intervention priorities

PSO: Construction of NHC
Outcome: Improved safety and facilities

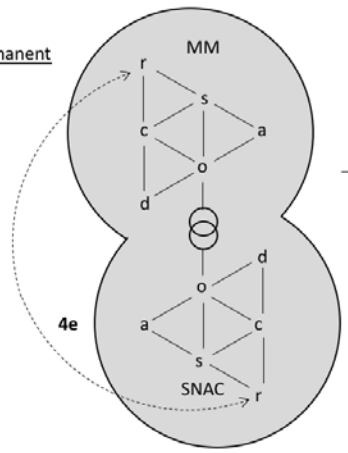
Residents

Contradiction LTP2c:
Formal approval application

Local government

- Zoning scheme does not allow permanent structure of a public nature
- LUM & BDD

- Partnership with COCT



- Statutory framework and process for construction approval
- Zoning scheme (utility services)

- VPUU acts as intermediary between residents, COCT, and WCG
- VPUU to apply for construction approval

- VPUU
- SUN Development

- NHC must have a sense of permanence

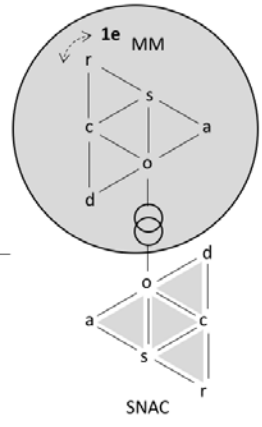
PSO: Construction of NHC
Outcome: Improved safety and facilities

Residents

Contradiction LTP2d:
Formal approval application

Local government

- Zoning scheme does not allow permanent structure of a public nature
- Concrete foundation required
- LUM & BDD



- Statutory framework and process for construction approval
- Zoning scheme (utility services)

- VPUU acts as intermediary between residents, COCT, and WCG
- VPUU to apply for construction approval

- VPUU
- SUN Development

PSO: Construction of NHC
Outcome: Improved safety and facilities

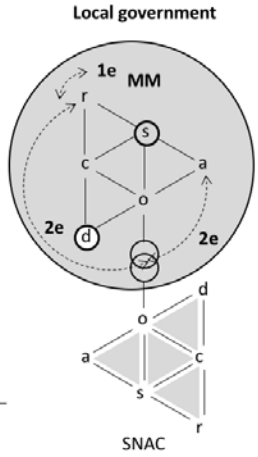
Residents

Knot LTP2e:
Formal approval application

- Zoning scheme does not allow permanent structure of a public nature
- Concrete foundation required
- LUM & BDD
- BDD to approve application and issue occupancy and compliance certificates
- **MM expedites approval process for a temporary building, provides shipping container information, and assists with Fire Safety Department approval**
- BDD and Fire Safety Department to undertake yearly inspections

- Partnership with COCT

PSO: Construction of NHC
Outcome: Improved safety and facilities



- Statutory framework and process for construction approval
- Zoning scheme (utility services)

- VPUU acts as intermediary between residents, COCT, and WCG
- VPUU to apply for construction approval

- VPUU
- SUN Development

- CAP intervention priorities

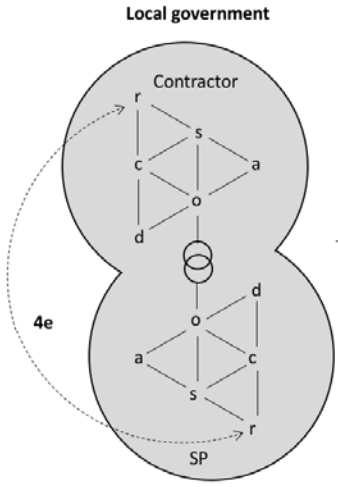
Contradiction LTP3a:
Residents and alternative techniques

- Temporary structure
- Alternative construction techniques

- Contractor and resident builders to construct NHC

- (Limited) skills and construction experience of resident builders

PSO: Construction of NHC
Outcome: Improved safety and facilities

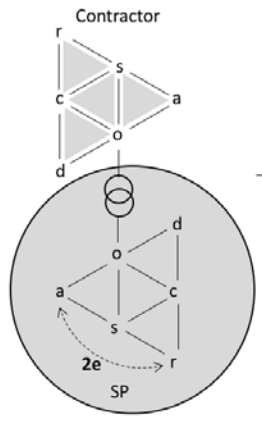


- Tender procedure
- Subcouncil database

- Employ residents as builders via COCT subcouncil database

Contradiction LTP3b:
Residents and alternative techniques

Local government



- Contractor and resident builders to construct NHC

- (Limited) skills and construction experience of resident builders

PSO: Construction of NHC
Outcome: Improved safety and facilities

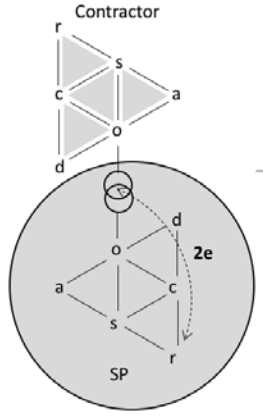
- Tender procedure
- Subcouncil database

- Employ residents as builders via COCT subcouncil database

Residents

Contradiction LTP3c:
Residents and alternative techniques

Local government



- Contractor and resident builders to construct NHC

- (Limited) skills and construction experience of resident builders

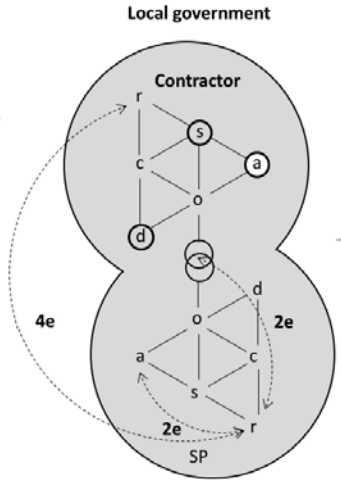
PSO: Construction of NHC
Outcome: Improved safety and facilities

- Tender procedure
- Subcouncil database

- Employ residents as builders via COCT subcouncil database

Residents

Knot LTP3d:
Residents and alternative techniques



- Temporary structure
- Alternative construction techniques

- Contractor and resident builders to construct NHC
- **Contractor initiates mentoring process**

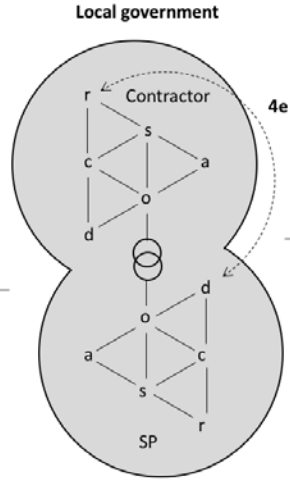
- (Limited) skills and construction experience of resident builders

- Tender procedure
- Subcouncil database
- **Mentoring process**

- Employ residents as builders via COCT subcouncil database

PSO: Construction of NHC
Outcome: Improved safety and facilities

Contradiction LTP3e:
Residents and alternative techniques



- Temporary structure
- No municipal services connections (off-grid)

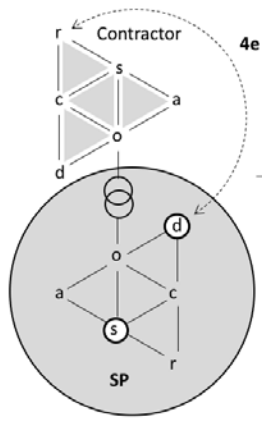
- SNAC and local groups to operate NHC

PSO: Construction of NHC
Outcome: Improved safety and facilities

Knot LTP3f:
Residents and alternative techniques

Local government

- Temporary structure
- No municipal services connections (off-grid)



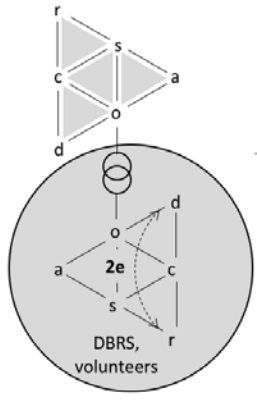
- SNAC and local groups to operate NHC
- **SP assists with solar water heater and greywater system after completion**

PSO: Construction of NHC
Outcome: Improved safety and facilities

Residents

Contradiction LTP4a:
Insufficient consultation

Local government



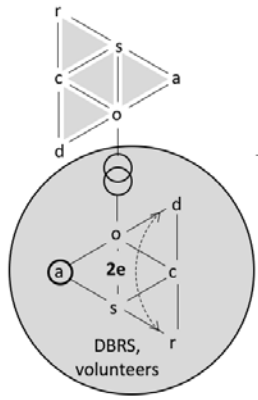
- Volunteers (unable) to identify and justify preferred design
- VPUU (KE, SP)
- SNAC
- Locally owned co-design process
- SNAC must be consulted during co-design process

PSO: Design of spatial intervention
Outcome: Consolidation of public node

Residents

Knot LTP4b:
Insufficient consultation

Local government



Residents

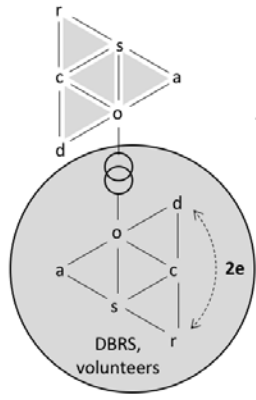
- **Vote to indicate preferred design**

PSO: Design of spatial intervention
Outcome: Consolidation of public node

- Volunteers (unable) to identify and justify preferred design
- VPUU (KE, SP)
- SNAC
- Locally owned co-design process
- SNAC must be consulted during co-design process

Contradiction LTP4c:
Insufficient consultation

Local government



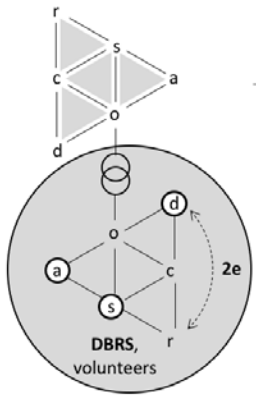
Residents

PSO: Design of spatial intervention
Outcome: Consolidation of public node

- MP unable to liaise with SNAC during co-design process
- MP (on maternity leave)
- VPUU (KE, SP)
- SNAC
- Locally owned co-design process
- SNAC must be consulted during co-design process

Knot LTP4d:
Insufficient consultation

Local government



Residents

- **Revised computer rendering and cardboard model**
- **Language skills**

PSO: Design of spatial intervention
Outcome: Consolidation of public node

- MP unable to liaise with SNAC during co-design process
- **DBRS attends weekly SNAC meeting to clarify design**

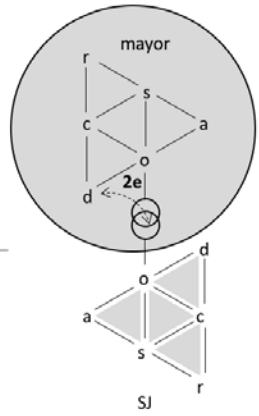
- MP (on maternity leave)
- VPUU (KE, SP)
- SNAC

- Locally owned co-design process
- SNAC must be consulted during co-design process

Contradiction SHF1a:
No response to upgrading requests

Local government

- UISP scope of works
- Ward councillor
- COCT to facilitate settlement upgrading



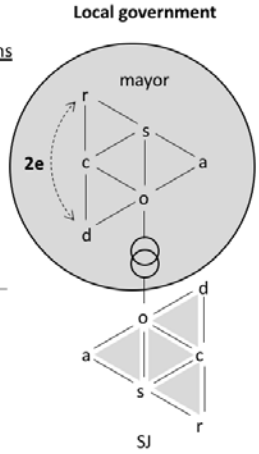
Residents

- Resident leadership
- UBU

PSO: Upgrading of settlement
Outcome: Improved living conditions

Contradiction SHF1b:
No response to upgrading requests

- COCT can only upgrade settlement if it owns all the land the settlement is located on
- UISP scope of works
- Closed corporation
- COCT to facilitate settlement upgrading

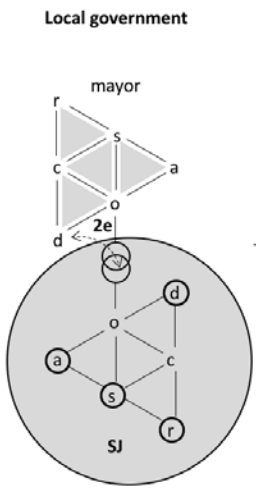


- Resident leadership
- UBU

PSO: Upgrading of settlement
Outcome: Improved living conditions

Knot SHF1c:
No response to upgrading requests

- UISP scope of works
- Ward councillor
- COCT to facilitate settlement upgrading
- **Violent protest action**



- **SJ invited to meet with mayor**
- Resident leadership
- UBU
- **Violent protest action required in order to gain attention of COCT**

PSO: Upgrading of settlement
Outcome: Improved living conditions

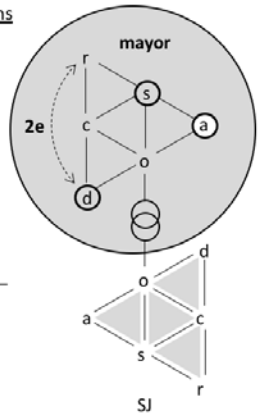
Knot SHF1d:
No response to upgrading requests

Local government

- COCT can only upgrade settlement if it owns all the land the settlement is located on
- UISP scope of works

- Closed corporation
- Ward councillor

- COCT to facilitate settlement upgrading
- **COCT purchases land to enable project**



- **Budget to purchase remaining land**
- **UISP project**

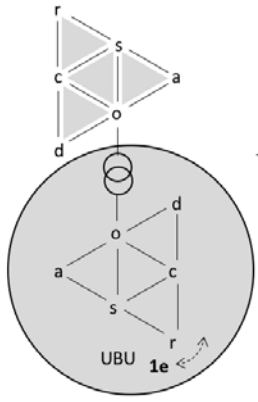
- Resident leadership
- UBU

PSO: Upgrading of settlement
Outcome: Improved living conditions

Residents

Contradiction SHF2a:
Dwelling typology rejected

Local government



- UBU prepares key factor diagram and upgrading feasibility studies

- Upgrading feasibility studies
- Baseline survey information
- Key factors diagram

- Resident leadership

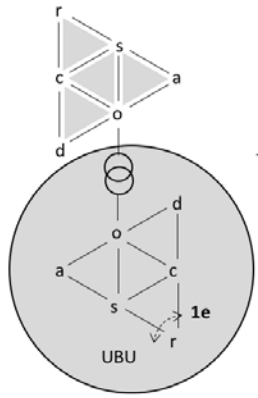
- Cultural practices
- Two-storey walk-up typology (some units without ground floor)
- Preserve density (clustering)

PSO: Dwelling typology
Outcome: Upgrading of settlement

Residents

Contradiction SHF2b:
Dwelling typology rejected

Local government



Residents

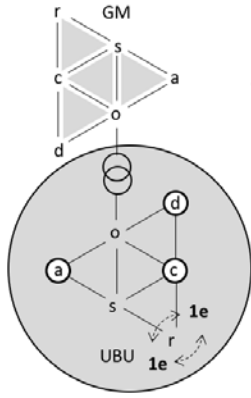
- Upgrading feasibility studies
- Baseline survey information
- Key factors diagram

PSO: Dwelling typology
Outcome: Upgrading of settlement

- UBU prepares key factor diagram and upgrading feasibility studies
- Resident leadership
- Two-storey walk-up typology (some units without ground floor)
- Standard-size typology
- Preserve density (clustering)

Knot SHF2c:
Dwelling typology rejected

Local government



Residents

- UISD
- GM attends general meeting
- GM prepares draft guidelines for UISP project facilitation

- Upgrading feasibility studies
- Baseline survey information
- Key factors diagram
- **Alternative dwelling typology**

PSO: Dwelling typology
Outcome: Upgrading of settlement

- Draft guidelines for UISP facilitation

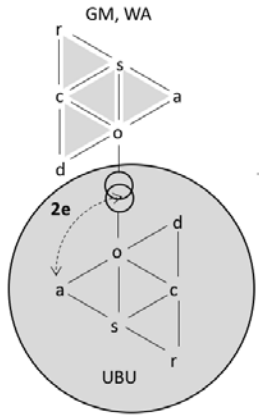
- UBU prepares key factor diagram and upgrading feasibility studies
- **NP takes ownership of co-design process, proposes alternative dwelling typology**
- **UBU to refine and develop alternative dwelling typology**
- Resident leadership
- **NP**
- Cultural practices
- Two-storey walk-up typology (some units without ground floor)
- Standard-size typology
- Preserve density (clustering)

Contradiction SHF3a:
Process house construction

Local government

- UISD

- (Lack of) funding to develop prototype



- UISP project

- Resident volunteers

- Self-build typology

PSO: Construction of process house
Outcome: Visualisation of settlement upgrading

Residents

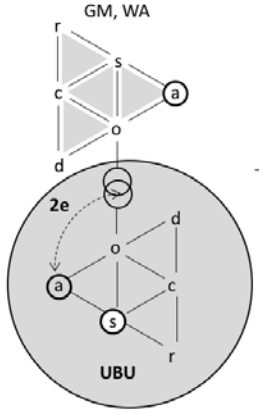
Knot SHF3b:
Process house construction

Local government

- UISD

- GM encourages UBU to enter BLC

- (Lack of) funding to develop prototype
- **ZAR 50 000 donation**



- **BLC**
- UISP project

- UBU and resident volunteers to construct prototype for BLC

- Resident volunteers

- Self-build typology

PSO: Construction of process house
Outcome: Visualisation of settlement upgrading

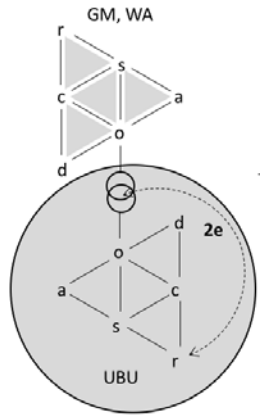
Residents

Contradiction SHF3c:
Process house construction

Local government

- UISD

- Timber frame components and sandbag walls



- UISP project

- UBU and volunteers to construct process house on site
- Resident volunteers
- Permission to be obtained prior to construction on site

PSO: Construction of process house
Outcome: Visualisation of settlement upgrading

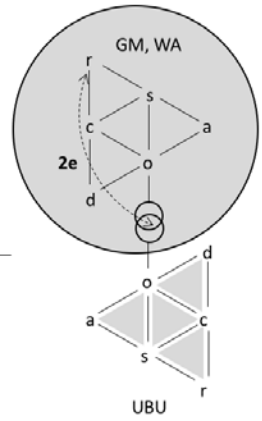
Residents

Contradiction SHF3d:
Process house construction

Local government

- Structural design must be approved by an engineer
- UISD

- Timber frame components and sandbag walls



- UISP project

- UBU and volunteers to construct process house on site
- Resident volunteers
- Self-build typology

PSO: Construction of process house
Outcome: Visualisation of settlement upgrading

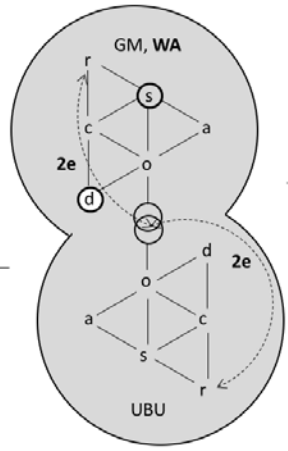
Residents

Knot SHF3e:
Process house construction

Local government

- Structural design must be approved by an engineer
- UISD
- **WA sends email giving permission for construction of process house**
- **WA assists with structural design**

- Timber frame components and sandbag walls



- UISP project

- UBU and volunteers to construct process house on site (using BLC prototype components)
- Resident volunteers
- Permission to be obtained prior to construction on site

PSO: Construction of process house
Outcome: Visualisation of settlement upgrading

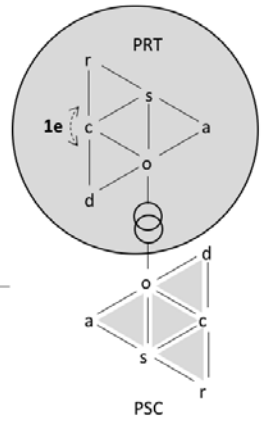
Residents

Contradiction SHF4a:
Conflicting subdivision plans

Local government

- UISD
- SPUDD

- Superblock plan
- Subdivision plan



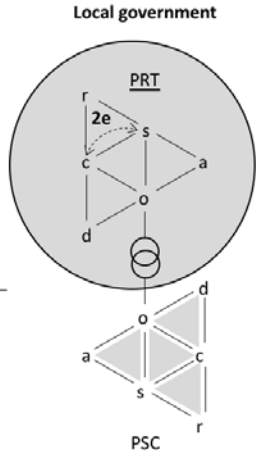
- UISP project

- UBU and PSC develop superblock and subdivision plan
- PSC needs and requirements

PSO: Spatial reconfiguration
Outcome: Improved living conditions

Residents

Contradiction SHF4b:
Conflicting subdivision plans



- SPUDD guidelines for human settlements
- UISD
- SPUDD

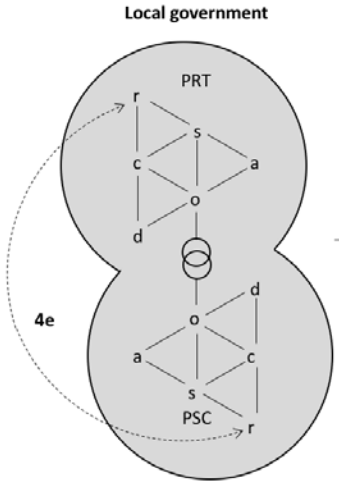
- Subdivision plan

- UISP project

- PSC needs and requirements

PSO: Spatial reconfiguration
Outcome: Improved living conditions

Contradiction SHF4c:
Conflicting subdivision plans



- SPUDD prescribes over sixty development conditions
- UISD
- SPUDD

- Subdivision plan

- UISP project

- PSC needs and requirements

PSO: Spatial reconfiguration
Outcome: Improved living conditions

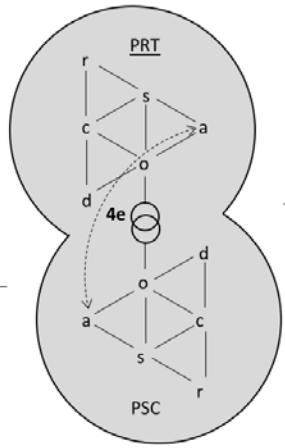
Contradiction SHF4d:
Conflicting subdivision plans

Local government

- SPUDD guidelines for human settlements
- SPUDD prescribes over sixty development conditions

- UISD
- SPUDD

- SPUDD develops own subdivision plan



- UISP project
- SPUDD subdivision plan

- PSC subdivision plan

PSO: Spatial reconfiguration
Outcome: Improved living conditions

Residents

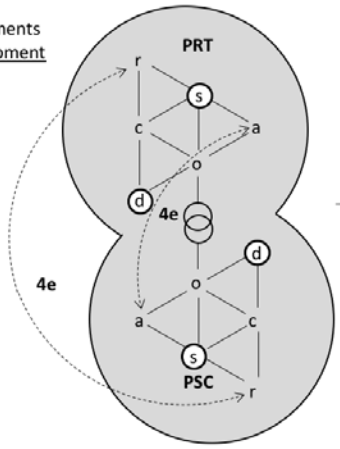
Knot SHF4e:
Conflicting subdivision plans

Local government

- SPUDD guidelines for human settlements
- SPUDD prescribes over sixty development conditions

- UISD
- SPUDD

- SPUDD develops subdivision plan
- **PRT, UISD, and SPUDD engage in lengthy negotiations**



- UISP project
- SPUDD subdivision plan

- UBU and PSC develop superblock and subdivision plan
- **PSC engages in lengthy negotiations**

- Superblock plan
- PSC subdivision plan

- PSC needs and requirements

PSO: Spatial reconfiguration
Outcome: Improved living conditions

Residents

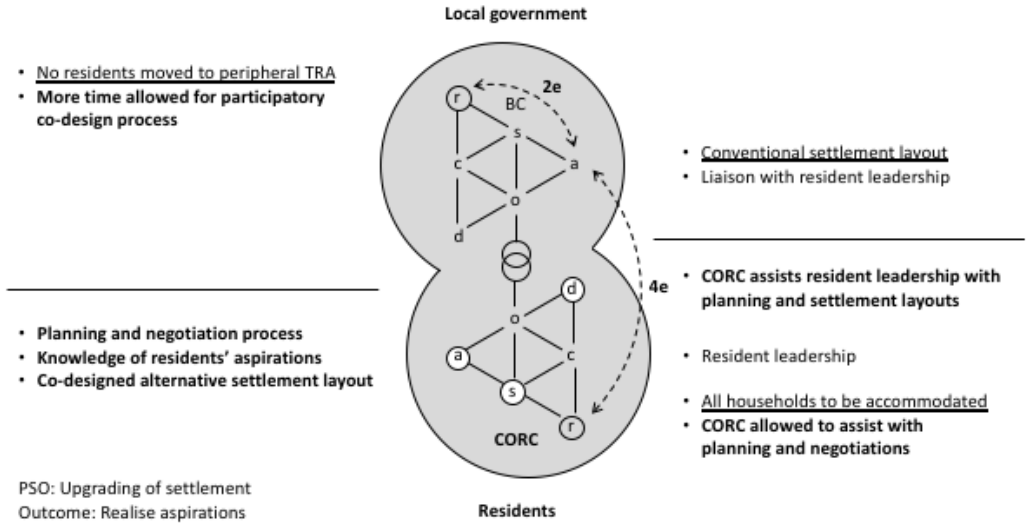
C Fold-out GAP knots diagrams

The intention of the fold-out diagrams included in this appendix is to facilitate ease of cross-reference between the knotworking that pertains to GAP, as identified and mapped in the descriptive narrative and mapping section of each of the case studies in Chapter 5, and the further discussion thereof in Chapter 6. All diagrams are by the author.

D Knotworking competencies and capacities

The SACAP competencies and capacities for 'subversive praxis' (SACAP, 2010 and Pieterse, 2004: 350-352, respectively) that pertain to the GAP knots discussed in Chapter 4 are listed below each mapping diagram included in this appendix. These are referred to and discussed in section 5.1.2.

Knot LWP1c:
Consultant's layout rejected



Relevant SACAP competencies

2. Environmental relationships
a. Understanding of the relationship between the natural and the built environment.
b. Ability to evaluate landscapes and environmental structures in basic terms in an analytical, constructive, and critical manner.
c. Understanding of the basic spatial, functional, and aesthetic aspects appropriate to landscape architecture.

5. Contextual and urban relationships:
a. Understanding of the basic spatial, functional, and aesthetic aspects appropriate to urban design.
b. Ability to evaluate urban environments in very basic terms in an analytical, constructive, and critical manner.

6. Architectural history, theory, and precedent
b. Ability to evaluate and analyse the built form critically in complex terms.
c. Understanding of the principles of learning from historical precedent.
d. Understanding of the social, ethical, spatial, and aesthetic aspects of the environment.

8. Contract documentation and administration
g. Ability to respond to local authority approval requirements and procedures.

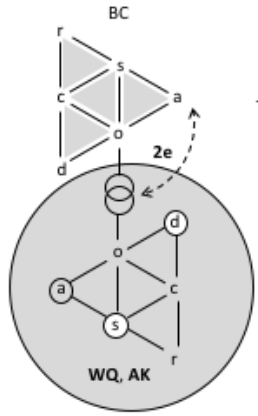
Relevant subversive praxis capacities

- Code-switching between formal and informal registers of knowledge.
- Adopting a multi-focal perspective to challenge and transform power relations.
- Developing an understanding of a specific context in empirical terms, and contextualising this knowledge in larger scale analysis.
- Developing an understanding of the symbolic, imaginary, and phenomenological dimensions of the context.

Knot LWP2c:
Co-designed layout deviates

Local government

- Report on existing conditions
- **Warning of potential protest action**



- Services infrastructure layout

- WQ and resident leadership prepares report on existing conditions
- **AK reviews co-designed alternative layout to reduce deviations from services infrastructure layout**

- Resident leadership
- CORC

- All households to be accommodated
- Respect contours and existing pathways
- Varying plot sizes

PSO: Co-designed alternative settlement layout
Outcome: Upgrading of settlement

Residents

Relevant SACAP competencies

1. Architectural design
d. Ability to develop the design to an ultimate and rational conclusion.

2. Environmental relationships
b. Ability to evaluate landscapes and environmental structures in basic terms in an analytical, constructive, and critical manner.
c. Understanding of the basic spatial, functional, and aesthetic aspects appropriate to landscape architecture.

5. Contextual and urban relationships:
a. Understanding of the basic spatial, functional, and aesthetic aspects appropriate to urban design.
b. Ability to evaluate urban environments in very basic terms in an analytical, constructive, and critical manner.

6. Architectural history, theory, and precedent
d. Understanding of the social, ethical, spatial, and aesthetic aspects of the environment.

7. Building services and related technologies
a. Ability to integrate the various technological aspects relating to services in one cohesive design and find technological solutions.

8. Contract documentation and administration
g. Ability to respond to local authority approval requirements and procedures.

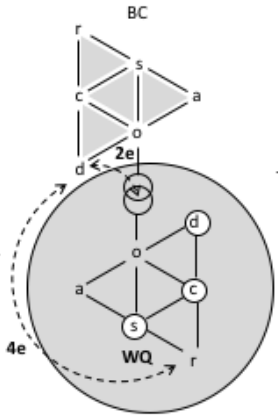
Relevant subversive praxis capacities

- Developing an understanding of a specific context in empirical terms, and contextualising this knowledge in larger scale analysis.
- Developing an understanding of the symbolic, imaginary, and phenomenological dimensions of the context.

Knot LWP3c:
Conflict regarding implementation

Local government

- UISD
- Roads and Stormwater Department
- UISD supplies truck and emergency housing kits
- BC (refuses) to mark out layout



- Truck
- Emergency housing kit

- **CORC employees mark out layout**
- **WQ facilitates allocation of plots**
- **CORC**
- Co-designed layout to be implemented

PSO: Move residents to relocation site
Outcome: Settlement upgrading (residents), canal widening (local government)

Residents

Relevant SACAP competencies

10. Office practice, legal aspects, and ethics
h. Ability to participate meaningfully in the management and administration of a building project.
i. Ability to set up and run an building project successfully.

Relevant subversive praxis capacities

- Code-switching between formal and informal registers of knowledge.
- Self-reflexivity so as to recognise yourself and your own desires in a development process.
- Adopting a multi-focal perspective to challenge and transform power relations.

Knot LWP4b:
Inadequate capacity for upgrading

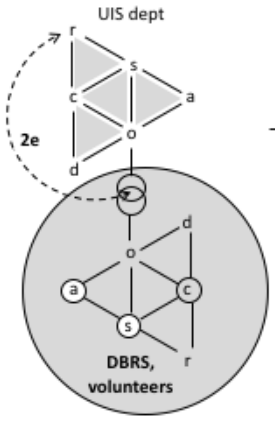
Local government

- UISP project application requires revised settlement layout and dwelling typologies

- UISD supplies cadastral maps and aerial photographs

- **Live project**
- Enumeration and mapping documentation
- Cadastral maps and aerial photographs
- **Revised settlement layout and dwelling typologies**

PSO: Application for UISP project
Outcome: Further upgrading of settlement



- UISP methodology

- CORC supplies documentation
- DBRS, WQ, SM, and DF develop brief
- DBRS and resident volunteers undertake co-design process

- **CORC**

- Medium-density incremental housing
- Co-design process

Relevant SACAP competencies

1. Architectural design
a. Ability to do a competent building design of a complex nature, based on parameters and constraints developed through independent scientific research, and sensitive to issues of environment and sustainability, as well as cultural issues, in a responsible, appropriate, and economical manner in an urban, suburban, or rural context.
b. Ability to appraise and define a complex architectural problem.
c. Ability to prepare an appropriate concept.
d. Ability to develop the design to an ultimate and rational conclusion.
e. Ability to present the design synthesis in a logical manner.

2. Environmental relationships
a. Understanding of the relationship between the natural and the built environment.
b. Ability to evaluate landscapes and environmental structures in basic terms in an analytical, constructive, and critical manner.
c. Understanding of the basic spatial, functional, and aesthetic aspects appropriate to landscape architecture.

3. Construction technology
a. Ability to implement innovative applications of construction methods and uses for materials related to multi-storey, multi-functional, complex building types.
b. Ability to recognise the demands of context, local resources, and appropriate technologies that harmonise with the environment, which influence the construction of a building.
c. Ability to develop durable, cost-effective, climate responsive construction details.
d. Ability to conduct advanced research into construction methods and materials, and their appropriate applications.

4. Building structures:
a. Understanding of structural concepts pertaining to buildings.
b. Ability to integrate structure and building design.

Relevant subversive praxis capacities

- Code-switching between formal and informal registers of knowledge.
- Adopting a multi-focal perspective to challenge and transform power relations.
- Self-reflexivity so as to recognise yourself and your own desires in a development process.
- Developing an understanding of a specific context in empirical terms, and contextualising this knowledge in larger scale analysis.
- Developing an understanding of the symbolic, imaginary, and phenomenological dimensions of the context.

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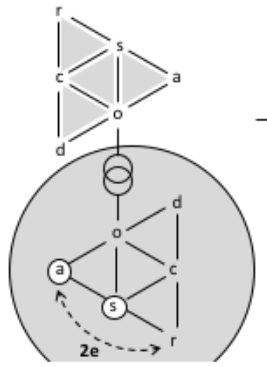
5. Contextual and urban relationships:
a. Understanding of the basic spatial, functional, and aesthetic aspects appropriate to urban design.
b. Ability to evaluate urban environments in very basic terms in an analytical, constructive, and critical manner.

6. Architectural history, theory, and precedent
b. Ability to evaluate and analyse the built form critically in complex terms.
c. Understanding of the principles of learning from historical precedent.
d. Understanding of the social, ethical, spatial, and aesthetic aspects of the environment.

8. Contract documentation and administration
c. Ability to recognise the demands of context and local resources, and appropriate technologies that harmonise with the environment.
d. Understanding of issues of sustainability of the built environment and ability to be able to evaluate materials in an ethical and socially responsible manner.
g. Ability to respond to local authority approval requirements and procedures.

Knot LTP1c:
Architectural communication

Local government



- Project brief
- Technical architectural drawings
- Presentations at SNAC meetings
- **Cardboard models**

SP, SNAC, local groups, future users

- SP, SNAC, members of local groups, and future users to co-design NHC
- SNAC consults wider stakeholder group
- Local groups
- Future users
- VPUU workstream representatives
- Co-design process
- Each iteration approved by SNAC, local groups, and future users

PSO: Design of NHC
Outcome: Construction of NHC

Residents

Relevant SACAP competencies

1. Architectural design
e. Ability to present the design synthesis in a logical manner.

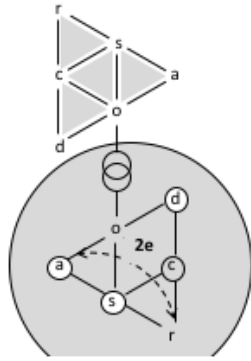
Relevant subversive praxis capacities

- Code-switching between formal and informal registers of knowledge.
- Adopting a multi-focal perspective to challenge and transform power relations.

Knot LTP1e:
Architectural communication

Local government

- Project brief
- Technical architectural drawings
- Presentations at SNAC meetings
- **Cardboard models**
- **User scenarios to plan activation**



SP, SNAC, local groups, future users

- SP, SNAC, members of local groups, and future users to co-design NHC
- SNAC consults wider stakeholder group
- **SP and VPUU workstream representatives facilitate co-design process**
- **SNAC and VPUU workstream representatives develop user scenarios to plan activation**

- **Local groups**
- **Future users**
- **VPUU workstream representatives**

- Co-design process
- Each iteration approved by SNAC, local groups, and future users

PSO: Design of NHC
Outcome: Construction of NHC

Residents

Relevant SACAP competencies

1. Architectural design
a. Ability to do a competent building design of a complex nature, based on parameters and constraints developed through independent scientific research, and sensitive to issues of environment and sustainability, as well as cultural issues, in a responsible, appropriate, and economical manner in an urban, suburban, or rural context.
b. Ability to appraise and define a complex architectural problem.
c. Ability to prepare an appropriate concept.
d. Ability to develop the design to an ultimate and rational conclusion.
e. Ability to present the design synthesis in a logical manner.

3. Construction technology
a. Ability to implement innovative applications of construction methods and uses for materials related to multi-storey, multi-functional, complex building types.
b. Ability to recognise the demands of context, local resources, and appropriate technologies that harmonise with the environment, which influence the construction of a building.
c. Ability to develop durable, cost-effective, climate responsive construction details.
d. Ability to conduct advanced research into construction methods and materials, and their appropriate applications.

4. Building structures:
a. Understanding of structural concepts pertaining to buildings.
b. Ability to integrate structure and building design.

5. Contextual and urban relationships:
b. Ability to evaluate urban environments in very basic terms in an analytical, constructive, and critical manner.

6. Architectural history, theory, and precedent
d. Understanding of the social, ethical, spatial, and aesthetic aspects of the environment.

Relevant subversive praxis capacities

- Code-switching between formal and informal registers of knowledge.
- Adopting a multi-focal perspective to challenge and transform power relations.
- Self-reflexivity so as to recognise yourself and your own desires in a development process.
- Developing an understanding of a specific context in empirical terms, and contextualising this knowledge in larger scale analysis.
- Developing an understanding of the symbolic, imaginary, and phenomenological dimensions of the context.

Knot LTP2e:
Formal approval application

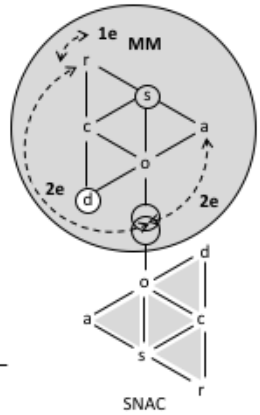
Local government

- Zoning scheme does not allow permanent structure of a public nature
- Concrete foundation required

- LUM & BDD

- BDD to approve application and issue occupancy and compliance certificates
- **MM expedites approval process for a temporary building, provides shipping container information, and assists with Fire Safety Department approval**
- BDD and Fire Safety Department to undertake yearly inspections

- Partnership with COCT



- Statutory framework and process for construction approval
- Zoning scheme (utility services)

- VPUU acts as intermediary between residents, COCT, and WCG
- VPUU to apply for construction approval

- VPUU
- SUN Development

- CAP intervention priorities

PSO: Construction of NHC
Outcome: Improved safety and facilities

Residents

Relevant SACAP competencies

1. Architectural design
b. Ability to appraise and define a complex architectural problem.

3. Construction technology
b. Ability to recognise the demands of context, local resources, and appropriate technologies that harmonise with the environment, which influence the construction of a building.
d. Ability to conduct advanced research into construction methods and materials, and their appropriate applications.

6. Architectural history, theory, and precedent
d. Understanding of the social, ethical, spatial, and aesthetic aspects of the environment.

8. Contract documentation and administration
c. Ability to recognise the demands of context and local resources, and appropriate technologies that harmonise with the environment.
d. Understanding of issues of sustainability of the built environment and ability to be able to evaluate materials in an ethical and socially responsible manner.
g. Ability to respond to local authority approval requirements and procedures.

Relevant subversive praxis capacities

- Adopting a multi-focal perspective to challenge and transform power relations.
- Self-reflexivity so as to recognise yourself and your own desires in a development process.
- Developing an understanding of a specific context in empirical terms, and contextualising this knowledge in larger scale analysis.

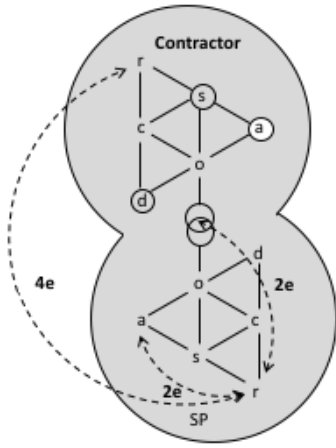
Knot LTP3d:
Residents and alternative techniques

Local government

- Temporary structure
- Alternative construction techniques

- Contractor and resident builders to construct NHC
- **Contractor initiates mentoring process**

- (Limited) skills and construction experience of resident builders



- Tender procedure
- Subcouncil database
- **Mentoring process**

- Employ residents as builders via COCT subcouncil database

PSO: Construction of NHC
Outcome: Improved safety and facilities

Residents

Relevant SACAP competencies

10. Office practice, legal aspects, and ethics
h. Ability to participate meaningfully in the management and administration of a building project.
i. Ability to set up and run an building project successfully.

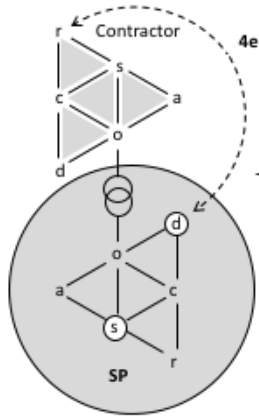
Relevant subversive praxis capacities

- Adopting a multi-focal perspective to challenge and transform power relations.
- Self-reflexivity so as to recognise yourself and your own desires in a development process.

Knot LTP3f:
Residents and alternative techniques

Local government

- Temporary structure
- No municipal services connections (off-grid)



- SNAC and local groups to operate NHC
- **SP assists with solar water heater and greywater system after completion**

PSO: Construction of NHC
Outcome: Improved safety and facilities

Residents

Relevant SACAP competencies

7. Building services and related technologies
a. Ability to integrate the various technological aspects relating to services in one cohesive design and find technological solutions.
c. Understanding of the following technological aspects and building services:
Drainage and water reticulation; electrical and electronic services and lighting; and heating and cooling.

8. Contract documentation and administration
c. Ability to recognise the demands of context and local resources, and appropriate technologies that harmonise with the environment.

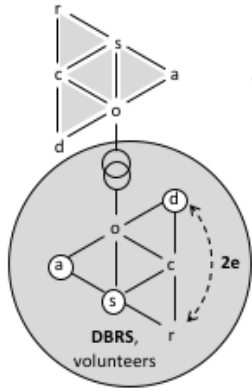
10. Office practice, legal aspects, and ethics
h. Ability to participate meaningfully in the management and administration of a building project
i. Ability to set up and run an building project successfully.

Relevant subversive praxis capacities

- Code-switching between formal and informal registers of knowledge.
- Self-reflexivity so as to recognise yourself and your own desires in a development process.

Knot LTP4d:
Insufficient consultation

Local government



- **Revised computer rendering and cardboard model**
- **Language skills**

- MP unable to liaise with SNAC during co-design process
- **DBRS attends weekly SNAC meeting to clarify design**

- MP (on maternity leave)
- VPUU (KE, SP)
- SNAC

- Locally owned co-design process
- SNAC must be consulted during co-design process

PSO: Design of spatial intervention
Outcome: Consolidation of public node

Residents

Relevant SACAP competencies

1. Architectural design
e. Ability to present the design synthesis in a logical manner.

9. Understanding of the range of computer technology presently in use in architectural practice.
a. Ability to apply a range of computer technology presently in use in architectural practice in the execution of work, with computer software including: three dimensional modelling programs, and graphic and image editing programs.

10. Office practice, legal aspects, and ethics
h. Ability to participate meaningfully in the management and administration of a building project.

Relevant subversive praxis capacities

- Code-switching between formal and informal registers of knowledge.
- Adopting a multi-focal perspective to challenge and transform power relations.
- Self-reflexivity so as to recognise yourself and your own desires in a development process.
- Developing an understanding of the symbolic, imaginary, and phenomenological dimensions of the context.

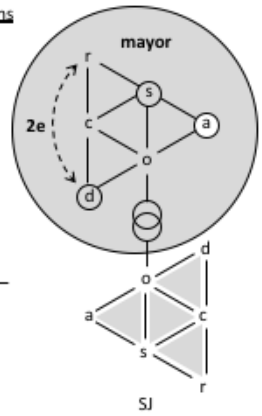
Knot SHF1d:
No response to upgrading requests

Local government

- COCT can only upgrade settlement if it owns all the land the settlement is located on
- UISP scope of works

- Closed corporation
- Ward councillor

- COCT to facilitate settlement upgrading
- **COCT purchases land to enable project**



- **Budget to purchase remaining land**
- **UISP project**

- Resident leadership
- UBU

PSO: Upgrading of settlement
Outcome: Improved living conditions

Residents

Relevant SACAP competencies

8. Contract documentation and administration
g. Ability to respond to local authority approval requirements and procedures.

Relevant subversive praxis capacities

- Adopting a multi-focal perspective to challenge and transform power relations.
- Developing an understanding of a specific context in empirical terms, and contextualising this knowledge in larger scale analysis.

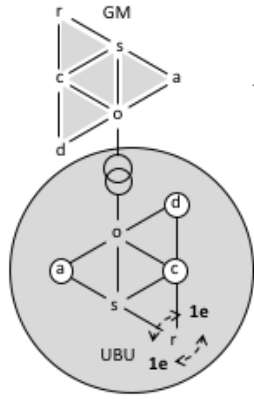
Knot SHF2c:
Dwelling typology rejected

Local government

- UISD

- GM attends general meeting
- GM prepares draft guidelines for UISP project facilitation

- Upgrading feasibility studies
- Baseline survey information
- Key factors diagram
- **Alternative dwelling typology**



- Draft guidelines for UISP facilitation

- UBU prepares key factor diagram and upgrading feasibility studies
- **NP takes ownership of co-design process, proposes alternative dwelling typology**
- **UBU to refine and develop alternative dwelling typology**

- Resident leadership
- **NP**

- Cultural practices
- Two-storey walk-up typology (some units without ground floor)
- Standard-size typology
- Preserve density (clustering)

PSO: Dwelling typology
Outcome: Upgrading of settlement

Residents

Relevant SACAP competencies

1. Architectural design
a. Ability to do a competent building design of a complex nature, based on parameters and constraints developed through independent scientific research, and sensitive to issues of environment and sustainability, as well as cultural issues, in a responsible, appropriate, and economical manner in an urban, suburban, or rural context.
b. Ability to appraise and define a complex architectural problem.
c. Ability to prepare an appropriate concept.
d. Ability to develop the design to an ultimate and rational conclusion.
e. Ability to present the design synthesis in a logical manner.

3. Construction technology
a. Ability to implement innovative applications of construction methods and uses for materials related to multi-storey, multi-functional, complex building types.
b. Ability to recognise the demands of context, local resources, and appropriate technologies that harmonise with the environment, which influence the construction of a building.
c. Ability to develop durable, cost-effective, climate responsive construction details.
d. Ability to conduct advanced research into construction methods and materials, and their appropriate applications.

4. Building structures:
a. Understanding of structural concepts pertaining to buildings.
b. Ability to integrate structure and building design.

6. Architectural history, theory, and precedent
b. Ability to evaluate and analyse the built form critically in complex terms.
d. Understanding of the social, ethical, spatial, and aesthetic aspects of the environment.

Relevant subversive praxis capacities

- Code-switching between formal and informal registers of knowledge.
- Adopting a multi-focal perspective to challenge and transform power relations.
- Self-reflexivity so as to recognise yourself and your own desires in a development process.
- Developing an understanding of a specific context in empirical terms, and contextualising this knowledge in larger scale analysis.
- Developing an understanding of the symbolic, imaginary, and phenomenological dimensions of the context.

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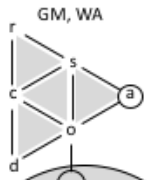
8. Contract documentation and administration
c. Ability to recognise the demands of context and local resources, and appropriate technologies that harmonise with the environment.
d. Understanding of issues of sustainability of the built environment and ability to be able to evaluate materials in an ethical and socially responsible manner.
g. Ability to respond to local authority approval requirements and procedures.

Knot SHF3b:
Process house construction

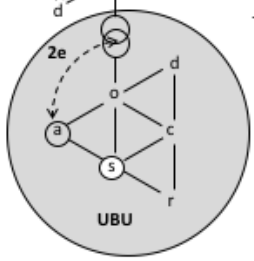
Local government

GM, WA



- UISD
- GM encourages UBU to enter BLC

- (Lack of) funding to develop prototype
- **ZAR 50 000 donation**



- **BLC**
- UISP project

- UBU and resident volunteers to construct prototype for BLC
- Resident volunteers
- Self-build typology

PSO: Construction of process house
Outcome: Visualisation of settlement upgrading

Residents

Relevant SACAP competencies

3. Construction technology
a. Ability to implement innovative applications of construction methods and uses for materials related to multi-storey, multi-functional, complex building types.
b. Ability to recognise the demands of context, local resources, and appropriate technologies that harmonise with the environment, which influence the construction of a building.
c. Ability to develop durable, cost-effective, climate responsive construction details.
d. Ability to conduct advanced research into construction methods and materials, and their appropriate applications.

4. Building structures:
a. Understanding of structural concepts pertaining to buildings.
b. Ability to integrate structure and building design.

5. Contextual and urban relationships:
c. Understanding of and sensitivity to urban aspects when designing individual buildings.

6. Architectural history, theory, and precedent
b. Ability to evaluate and analyse the built form critically in complex terms.
d. Understanding of the social, ethical, spatial, and aesthetic aspects of the environment.

Relevant subversive praxis capacities

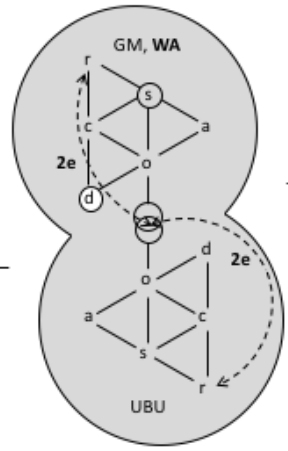
- Adopting a multi-focal perspective to challenge and transform power relations.
- Self-reflexivity so as to recognise yourself and your own desires in a development process.

Knot SHF3e:
Process house construction

Local government

- Structural design must be approved by an engineer
- UISD
- **WA sends email giving permission for construction of process house**
- **WA assists with structural design**

- Timber frame components and sandbag walls



- UISP project

- UBU and volunteers to construct process house on site (using BLC prototype components)
- Resident volunteers
- Permission to be obtained prior to construction on site

PSO: Construction of process house
Outcome: Visualisation of settlement upgrading

Residents

Relevant SACAP competencies

3. Construction technology
a. Ability to implement innovative applications of construction methods and uses for materials related to multi-storey, multi-functional, complex building types.
b. Ability to recognise the demands of context, local resources, and appropriate technologies that harmonise with the environment, which influence the construction of a building.
c. Ability to develop durable, cost-effective, climate responsive construction details.

4. Building structures:
a. Understanding of structural concepts pertaining to buildings.
b. Ability to integrate structure and building design.
c. Understanding of calculations on the structural aspects of buildings.

8. Contract documentation and administration
b. Ability to develop durable, cost-effective, climate-responsive construction systems and details.
c. Ability to recognise the demands of context and local resources, and appropriate technologies that harmonise with the environment.
f. Ability to do component and material specification.
g. Ability to respond to local authority approval requirements and procedures.

Relevant subversive praxis capacities

- Adopting a multi-focal perspective to challenge and transform power relations.
- Self-reflexivity so as to recognise yourself and your own desires in a development process.

Knot SHF4e:
Conflicting subdivision plans

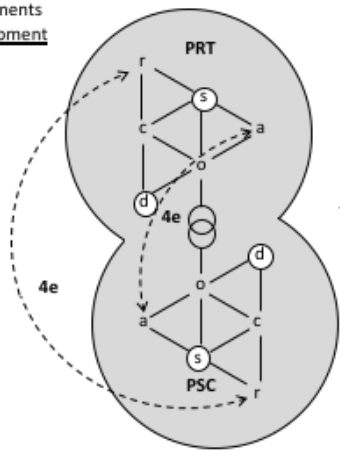
Local government

- SPUDD guidelines for human settlements
- SPUDD prescribes over sixty development conditions

- UISD
- SPUDD

- SPUDD develops subdivision plan
- **PRT, UISD, and SPUDD engage in lengthy negotiations**

- Superblock plan
- PSC subdivision plan



- UISP project
- SPUDD subdivision plan

- UBU and PSC develop superblock and subdivision plan
- **PSC engages in lengthy negotiations**

- PSC needs and requirements

PSO: Spatial reconfiguration
Outcome: Improved living conditions

Residents

Relevant SACAP competencies

5. Contextual and urban relationships:
b. Ability to evaluate urban environments in very basic terms in an analytical, constructive, and critical manner.

8. Contract documentation and administration
g. Ability to respond to local authority approval requirements and procedures.

Relevant subversive praxis capacities

- Code-switching between formal and informal registers of knowledge.
- Adopting a multi-focal perspective to challenge and transform power relations.
- Self-reflexivity so as to recognise yourself and your own desires in a development process.
- Developing an understanding of a specific context in empirical terms, and contextualising this knowledge in larger scale analysis.
- Developing an understanding of the symbolic, imaginary, and phenomenological dimensions of the context.